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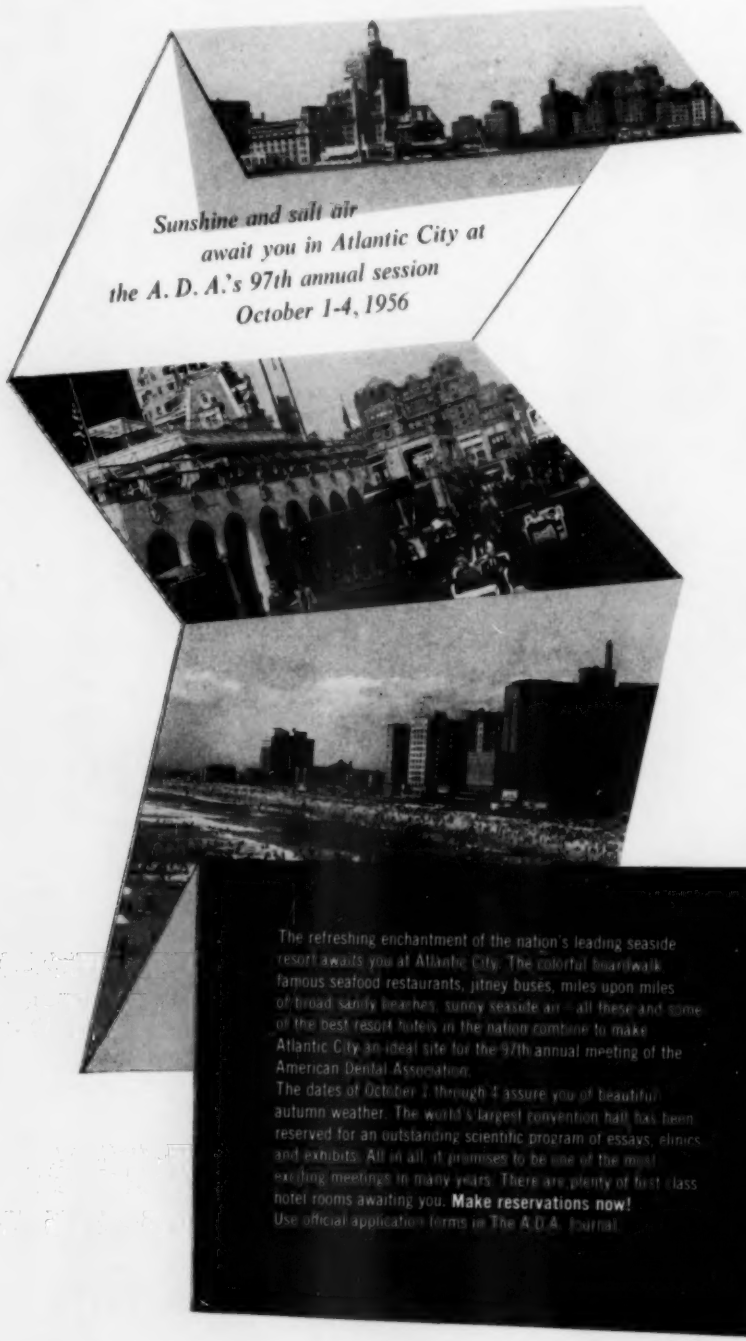
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SPECIAL BULLETIN

Association urges early construction of National Institute of Dental Research building before Senate subcommittee

On February 29th, the Subcommittee on Health of the Senate Committee on Labor and Public Welfare held hearings on the Association's proposal (S.3246) to increase from $2,000,000 to $5,000,000 the amount authorized for the construction of a building to house the National Institute of Dental Research. Six witnesses testified in favor of the bill. They were: C. Willard Camalier, assistant secretary of the American Dental Association in charge of the Washington office, Harry Lyons, president-elect of the Association, J. Roy Doty, secretary of the Association's Council on Dental Therapeutics, H. Trendley Dean, secretary of the Association's Council on Dental Research, Joseph Volker, president-elect of the International Association for Dental Research, and Mrs. Charles D. Center, assistant director of public health education, Department of Public Health, State of Georgia. Bernard J. Conway, secretary of the Council on Legislation also appeared before the Committee. Doctors Camalier and Lyons were introduced by Senators Murray of Montana and Robertson of Virginia, respectively, both of whom urged enactment of S.3246.

The text of the statements presented by Doctors Lyons and Doty follows:

I am Harry Lyons of Richmond, Va., president-elect of the American Dental Association. I am dean of the School of Dentistry of the Medical College of Virginia and am presently serving on the National Advisory Dental Research Council for the National Institute of Dental Research.

I am here today to urge enactment of S.3246 so that the way will be cleared for construction of the National Institute of Dental Research building. With me are C. Willard Camalier, assistant secretary of the American Dental Association in charge of the Washington office, J. Roy Doty, secretary of the Association's Council on Dental Therapeutics, H. Trendley Dean, secretary of the Association's Council on Dental Research, and Mr. Bernard J. Conway, secretary of the Association's Council on Legislation. The last three are staff members of the Association's Central Office in Chicago.

We also have with us a distinguished

dental educator and dental researcher from Alabama, Joseph F. Volker, dean of the School of Dentistry of the University of Alabama; he is here as the representative of the American Section of the International Association for Dental Research. I should also like to present Mrs. Charles D. Center, who is the assistant director of public health education, Department of Public Health of the State of Georgia.

The legislation, S.3246, which is the subject of this hearing, is a simple amendment to Section 5 of the National Dental Research Act, Public Law 755, 80th Congress. It would increase from $2,000,000 to $5,000,000 the amount authorized for the construction of a building to house the National Institute of Dental Research. Nearly eight years ago Congress authorized a $2,000,000 appropriation for the dental institute building. The plans for the building were completed in 1950 at a cost of nearly $100,000. Nothing further has been done on the building project.

THE ASSOCIATION'S RECOMMENDATION

The amount remaining under the existing authorization, $1,900,000, would not be sufficient to construct the dental institute building today. The Association has been informed that the building and equipment specified in the present plans would cost almost double the $2,000,000 authorized in 1948, should construction begin in fiscal year 1957. In order to assure that the authorization will be adequate, the American Dental Association urges that the amount be increased to $5,000,000 as proposed in S.3246.

HISTORY OF BUILDING PLANS

In enacting the National Dental Research Act of 1948, Congress declared its intention that the National Institute of Dental Research should have a separate building to house its activities. In 1949, the Public Health Service made plans to initiate the building construction. The Bureau of the Budget, however, did not allow a requested appropriation for $400,000 in cash and $1,500,000 for contract authorization in the fiscal year 1950 budget. On the recommendation of the American Dental Association, the Senate approved a full cash appropriation of $2,000,000. The fiscal year 1950 appropriation bill as enacted, however, provided only for an expenditure of $100,000 for the development of plans and specifications for the dental institute building.

During the budget hearings for fiscal year 1951, Dr. Norman H. Topping, then assistant director of the National Institutes of Health, gave the following information to the House of Representatives' Subcommittee on Appropriations for the Department of Labor and the Federal Security Agency—I am now quoting Doctor Topping:

> . . . I feel and Doctor Dyer feels that we need rather badly for the National Institute of Dental Research adequate space that is permanent, where it is not a question of makeshift moves and separation of the people; that they really need within the next two or three years a building that will be the permanent home for the National Institute of Dental Research . . .

During the same hearings, Doctor Topping made the following statement:

> . . . Like the other construction programs in research facilities, we have felt that basic laboratory research plus clinical research makes the total picture. Unless we have a building for dental research we will have to curtail some of the plans we have made over the past four years.

It was evidently Doctor Topping's position, and the position of the Public Health Service, that the Bureau of the Budget did not appreciate the necessity for developing the basic research program

of the National Institute of Dental Research. The Bureau of the Budget had disapproved the agency's request for the dental institute building appropriation on the ground that space could be made available in the Clinical Center for the dental research program.

During the hearings before the Senate Subcommittee on Appropriations for the Federal Security Agency, the Public Health Service representative again stressed the need for a separate building for the dental institute.

Shortly after the fiscal year 1951 budget hearings, the Korean conflict began, and, of necessity, the plans for constructing the dental institute building had to be postponed. That postponement has proved most costly not only in terms of monetary expenditures, but, more importantly, in terms of the serious delay it has imposed on this nation's progress toward the effective control and prevention of dental disease.

DIMENSIONS OF THE DENTAL HEALTH PROBLEM

The dental profession in the United States has achieved world leadership, yet the ravages of dental disease are of tremendous proportions in this country.

Almost all persons suffer from oral disease at some time during their lives.

Dental caries—tooth decay—is the most prevalent of all the diseases not only in the United States but in the world. Too many people, not only lay people but professional people as well in other areas of health, hold to the simple point of view—it is an uncritical point of view, an unlearned point of view—that dental caries is characterized by holes in the teeth which may interfere with dental function and which sometimes leads to dental pain, but that is about all.

The story needs to be told at this point, I believe, in a different light.

Dental caries is itself an infectious disease. That should be borne in mind, and it has very important—tremendously important—relations to dental health.

At a staff meeting in 1925 of professional people at the Mayo Clinic, the late Dr. Charles Mayo made the statement that the next great advance in the prevention of the chronic infections and degenerative diseases would have to be made by the dentist. This statement is as true today as it was when Doctor Mayo enunciated it in 1925, despite the fact that we have antibiotics and other great advances in medical care. As you may know, the antibiotics are very useful in the treatment of certain acute infections. They do nothing for the chronic ones, or very little for them. The chronic degenerative diseases pose possibly just as much of a problem today as they did in 1925.

Now, what Doctor Mayo had in mind was simply this: For infectious processes to invade the body there must be provided for the bacteria portals of entry. A few bacteria have the power of creating their own portals of entry—the organism of diphtheria is such an example. In most instances they have to have some other agent or some other cause to create a portal of entry into the body.

A portal of entry into the body is a break in the body's continuity, a cut, a scratch, a stab wound, an ulcer on the tonsil; or a carious cavity in the tooth may provide such a portal of entry.

Now, with 95 per cent of all persons in the United States suffering dental caries at one time or another, we have here a most rampant disease that provides portals of entry into our bodies for infectious processes beyond the dental field.

Reference has already been made here today to heart disease. Dental disease bears a relationship to several of the heart diseases of which there are, incidentally, many. For example, in rheumatic heart

disease—which is a killer of persons of all ages—a certain type of organism may be recovered from the bloodstream. A morphologically identical organism may be recovered from the roots of abscessed teeth, caused by dental caries. That is just one of many examples that may be cited to indicate the important relationships between cavities in teeth, created by dental decay, and general health problems.

I might also point out that 75 per cent of those who lose their teeth lose them because of another category of dental disease, the so-called gum diseases, known to laymen as pyorrhea and gingivitis.

As a further indication of the scope of our problem, 25 per cent of our children suffer from severe, deforming irregularities of teeth. One child out of every 800 born alive suffers from horrible, crippling deformities known as cleft palate and cleft lip, which have tremendous social implications aside from the very important health considerations.

Twenty-five per cent of the population above 15 years of age is wearing one or two full dentures as a result of previous dental disease.

If this picture is seen in total, no one can deny that it portrays an appalling drain on the national health. In terms of cost to the nation, the problem is of equally great proportions. The nation's yearly civilian dental bill is one and one-half billions of dollars, almost 13 per cent of the national expenditure for all private health services. The federal government spends many millions more for the dental health care of its beneficiaries. The Department of Defense, for example, spends about $100,000,000 annually for the dental health care of military personnel and uses the services of nearly 6,000 dentists in the Armed Forces. In spite of those very large outlays, less than one half of the population receives adequate dental care; in fact, many receive no dental care at all.

It is simply not reasonable to say that this pattern of dental disease and cost should continue without effective intervention by the only available weapon—dental research.

The dental diseases are not dramatized daily and continuously in a manner comparable to cancer, heart disease, arthritis and some of the crippling disorders of children. Nevertheless, they account for a tremendous toll in human suffering and depreciation of health status, and even bear an important relation to the ability of thousands of persons to gain employment.

AREAS FOR EXPANDED RESEARCH

Here are a few of the dental problems for which there is critical need for dental research, and because of which I am asking for your support in connection with an adequate facility for the National Institute of Dental Research. These are problems for which we are seeking the broad effective type of research possible only through the medium of such a facility:

1. Cleft palate and cleft lip developmental defects, occurring in one out of every 800 live births in this country. Although there are many treatment programs being developed for these horribly crippled children, very little has yet been done to establish the causes and thereby to work out a preventive program in this area of human affliction. We need the requested building, in part for the study of this problem.

2. "Crooked teeth" and associated facial deformities. Here, again, we have some corrective or remedial programs but little has been done toward a preventive solution of a problem which has a relation to nutrition, gastric disorders, personal esthetics, mental well-being and other health conditions. We need the re-

quested building, in part, for an exhaustive study of this problem.

3. Tooth decay and its infectious sequelae. These are problems so vast and complex that the only hope for their solution rests on the broadest possible approach involving many areas of basic and clinical research. We need the requested building, in part, for this problem.

4. The so-called gum diseases are essentially complete mysteries, as far as their causes and prevention are concerned. Given a long enough life, everyone succumbs to some type of gum disease, accounting for the loss of 75 per cent of all teeth. As in tooth decay, there are vitally important relationships between these diseases and general health. We need the requested building, in part, for the study of these problems.

5. There are the geriatric dental problems; that is, problems of the aged—an ever-growing challenge now reaching tremendous proportions in both our civilian and military veteran population. We need the requested building, in part, for these problems.

6. There are the virus infections with known effects on dental health—an essentially untouched problem. We need the requested building, in part, for these problems.

7. We should find the answer to the mystery of why 9 per cent of all cancers occur in the mouth and are related to the dental structure. We need the requested building, in part, for these problems.

8. The relation of dental infections to heart disease should be studied to the end that these ailments might be wiped out. Definite relationships between rheumatic heart disease and subacute bacterial endocarditis and dental infections are known to exist. To solve these problems is one of our greatest challenges. We need the requested building, in part, for these problems.

We could continue at great length on these and other dental problems.

A word or two might be voiced on the relation of the National Institute of Dental Research grant program and research in nonfederal institutions to the NIDR intramural program. They are not in conflict or in competition. They are both needed to complement and supplement each other in the research assault that should be made upon these tremendous afflictions.

THE DIRECT RESEARCH PROGRAM OF THE NIDR

The search for the solutions to these problems cannot be properly intensified without the participation and support of the federal government.

There are 43 dental schools and about seven nonfederal research centers presently conducting investigations of dental diseases. They receive little from endowments and have practically no access to the vast sums of money made available for research by the pharmaceutical industry. Federal support for dental research in the dental schools amounted to only $10,000 per school in fiscal year 1956.

The American Dental Association has urged Congress to increase from $800,000 to $3,855,000 the proposed fiscal 1957 expenditure for the grant program administered by the National Institute of Dental Research. That increase is vitally needed to support the many research projects which the dental schools have planned but cannot initiate because of lack of funds.

The dental schools and the seven other dental research centers have the facilities and personnel to conduct the expanded research program envisioned within the

Association's recommendations. All of those institutions, moreover, plan to increase their capacity for research. But they will not, in the foreseeable future, be able to carry out all of the investigations needed to conduct a realistic search for methods of controlling and preventing dental disease.

Many types of investigations in the areas in need of expanded research require expensive facilities and equipment that cannot ordinarily be provided by nonfederal research centers such as the dental schools. The direct research program of the National Institute of Dental Research was created to carry on such investigations. It is essential that the dental institute be provided with the space, facilities and equipment necessary to launch its contribution to the dental research program that this nation deserves.

The dental diseases are so complex in their causation that successful research on these problems requires the combined and coordinated knowledge and skills of many scientists of varied education and training: dentists, anatomists, histologists, histochemists, biochemists, physiologists, bacteriologists, nutritionists, pathologists, pharmacologists, physicists, roentgenologists, physicians, statisticians and others. Only in an adequately housed, equipped and staffed National Institute of Dental Research can all of these workers and their efforts be coordinated in an effective assault on major dental problems.

It seems to me that our federal government should respond to the urgent appeals of the dental profession to support and engage in research which may lead to the "preventive solution" of diseases afflicting our entire population. This is within the purview of "public health." A magnificent contribution which may be cited as an example of what may be accomplished at this level is public water fluoridation as an anti-caries measure. As you may know, the Kingston-Newburgh experiment has demonstrated a 58 per cent reduction in tooth decay in children six to nine years of age at a per capita cost in the range of 8 to 12 cents. An economist could wax quite eloquent on that point.

Since the "preventive solution" of dental disease is currently beyond the attainable scope of nonfederal agencies, I, representing the American Dental Association, urge that our federal government engage in major dental research endeavors of the magnitude necessary to solve the enormous dental problems.

To this end, I urge that the federal government construct, at the earliest possible date, an adequate building, equipped and staffed for these purposes.

An adequate centralized facility and the suggested broad research program would have a salutary effect on our dental schools. Here would be a fountainhead for information, coordination of research findings and guidance of researchers in our dental schools, leading to their greater productivity. Persons engaged in all varieties of dental research could receive training in such a center in the use of special equipment and technics. Highly trained research personnel could come to such a center under the visiting scientists' program. Expensive equipment housed in an adequate center would spare our dental schools the necessity of duplicating such installations, thus permitting them to use their own resources more effectively.

Not to be minimized, even though intangible, is the effect that such a center for dental research would have on the attitudes of practicing dentists, dental teachers and dental researchers. Many feel that our federal government is not now supporting dental research to the degree which the dental problems merit. More than this, there is reason to believe that more support at the national level would arouse the interest of persons and foundations in dental research and its importance to human welfare, to the point of adding their own contributions to its further support.

DR. DOTY'S TESTIMONY

I am J. Roy Doty of Chicago. I am secretary of the American Dental Association's Council on Dental Therapeutics. I shall devote my comments on S.3246 primarily to the critical need for additional space and facilities for the permanent staff of scientists at the National Institute of Dental Research.

The information contained in this statement has been developed by members of American Dental Association Councils or by persons employed by the Association who have had close, in some cases, direct affiliation with the National Institute of Dental Research. The American Dental Association has for many years supported fellowships at the dental institute. There are presently four employees of the Association who are performing scientific investigations on a full-time basis at the National Institute of Dental Research. (I might emphasize at this point that the Association has plans for increasing its support of research fellowships at the dental institute; the inadequacy of space and facilities, however, has prevented any expansion of that program.)

The secretary of the Association's Council on Dental Research, H. Trendley Dean, was formerly director of the National Institute of Dental Research.

The chairman of the Association's Council on Dental Research, Thomas J. Hill, has served as an acting assistant director of the institute.

Harold Hillenbrand, secretary of the American Dental Association, has served as a member of the National Advisory Dental Research Council.

Through this close contact with the Institute, the Association has first-hand knowledge of the physical facilities needed by the dental institute. My own evaluation of the facilities required for effective research is based upon my experience as a biochemist at the University of Illinois and as an assistant professor of physiology at the Louisiana State University School of Medicine, and more recently as a member of the National Advisory Dental Research Council.

The National Institute of Dental Research long ago outgrew the space assigned to it. Its facilities are scattered through several buildings; shifting of men from one laboratory to another has occurred frequently to reclaim space temporarily assigned to the dental scientists. But most importantly, there is extreme difficulty in achieving an efficient coordination of the total dental research effort of the dental institute.

The dental institute building, as planned, would contain about 35,000 square feet (net) of working space. The present facilities for the dental research activities provide less than 10,000 square feet. Some of the dental schools have more working space for dental research than is assigned to the National Institute of Dental Research with its much larger scientific staff. New York University and the University of Minnesota are good examples. The former has 15,000 square feet of its facilities available for dental research; the latter has 13,000.

Officials of the Public Health Service indicated in testimony on the fiscal 1950 and 1951 budgets that the Clinical Center and other planned construction could not provide sufficient space for the dental institute. That prediction is now a fact. The space and facilities occupied by the permanent staff of scientists at the National Institute of Dental Research are now inadequate, and severely limit plans for expanding the dental institute's direct research program, particularly in the vitally important field of basic research.

There are 34 full time "principal investigators" at the National Institute of Dental Research. Within a month or so the majority of the scientific staff will be moved to Building Two at the National Institutes of Health. There will be avail-

able to them at their next location approximately 125 square feet of floor space for each investigator and technical assistant. It should be noted, however, that the President's budget for fiscal 1957 proposes about 10 per cent increase in direct operations of the dental institute. It is obvious that additional space must be made available, or the added personnel must be crowded into still more cramped quarters. The move to Building Two, furthermore, will actually reduce somewhat the space for animal facilities.

The Association has been informed that the minimal standard allowance for the National Institutes of Health is 150 square feet of space for each principal investigator. Actually, in most of the institute buildings an average laboratory contains 218 square feet of floor space. In the new clinical center the typical module has 225 square feet.

There is a further factor of critical need for increased space. At this time the ratio of supporting laboratory personnel to scientific investigators is less than one to one. Most efficient use of the highly trained research staff will require an increase to provide two or more technicians or assistants for each principal investigator. This is simply impossible under presently proposed space allocation but could be realized within the next three to five years, if the proposed authorization and funds for the dental institute building are provided at this session of Congress.

At present, there is no area available to the dental scientists for a library or conference room where literature pertaining to dental research may be stored with convenient access for the dental staff. The scientific laboratories of the dental institute are scattered over an area corresponding to several city blocks. Investigators working on separate phases of a problem do not have an opportunity to check with each other as often as they should. This situation is especially regrettable for those in basic research disciplines who are attempting to collaborate with the clinical personnel. Members of the microbiology group, for example, are scattered in four separate buildings. It is virtually impossible to expect them to pool their efforts on clinical material.

The National Institute of Dental Research has a mandate from Congress to conduct investigations in two areas—basic research and clinical research. Unless plans are executed now for constructing adequate facilities for the dental institute, its basic research program cannot attain the effectiveness envisioned by the Congress. There would be a correspondingly lower effectiveness of the clinical research activities which must of necessity be correlated closely with the fundamental research areas.

As Dr. Lyons has already informed this committee, the American Dental Association emphatically supports an immediately enlarged grants program to increase dental research in dental schools and other nonfederal institutions. The Association also unreservedly supports the longer range program of providing adequate physical facilities for more efficient operation of the National Institute of Dental Research and for moderate increase in its personnel over a period of time. Even the immediate authorization and appropriation of funds for the dental institute building will not provide immediate facilities because of an anticipated time requirement of three or four years for construction. There is great urgency, therefore, to avoid any further delay.

The American Dental Association urges this committee to recommend approval of S.3246.

In behalf of the American Dental Association, I wish to thank the committee for the opportunity of presenting the Association's position on this vitally needed legislation, and to express the Association's deep appreciation to Senators Murray and Hill and to the other eight members of the Senate Committee on Labor and Public Welfare who co-sponsored S.3246.

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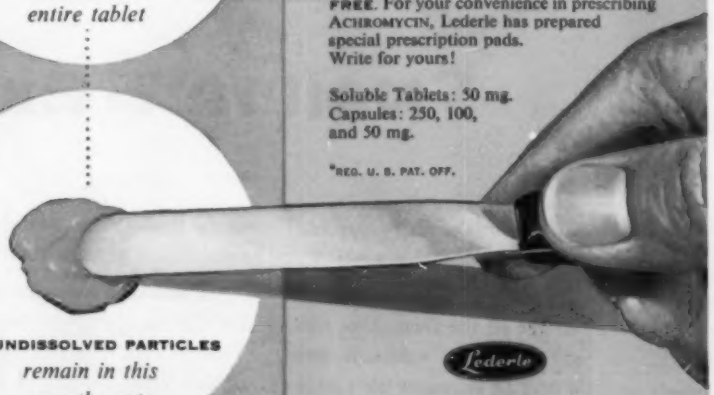

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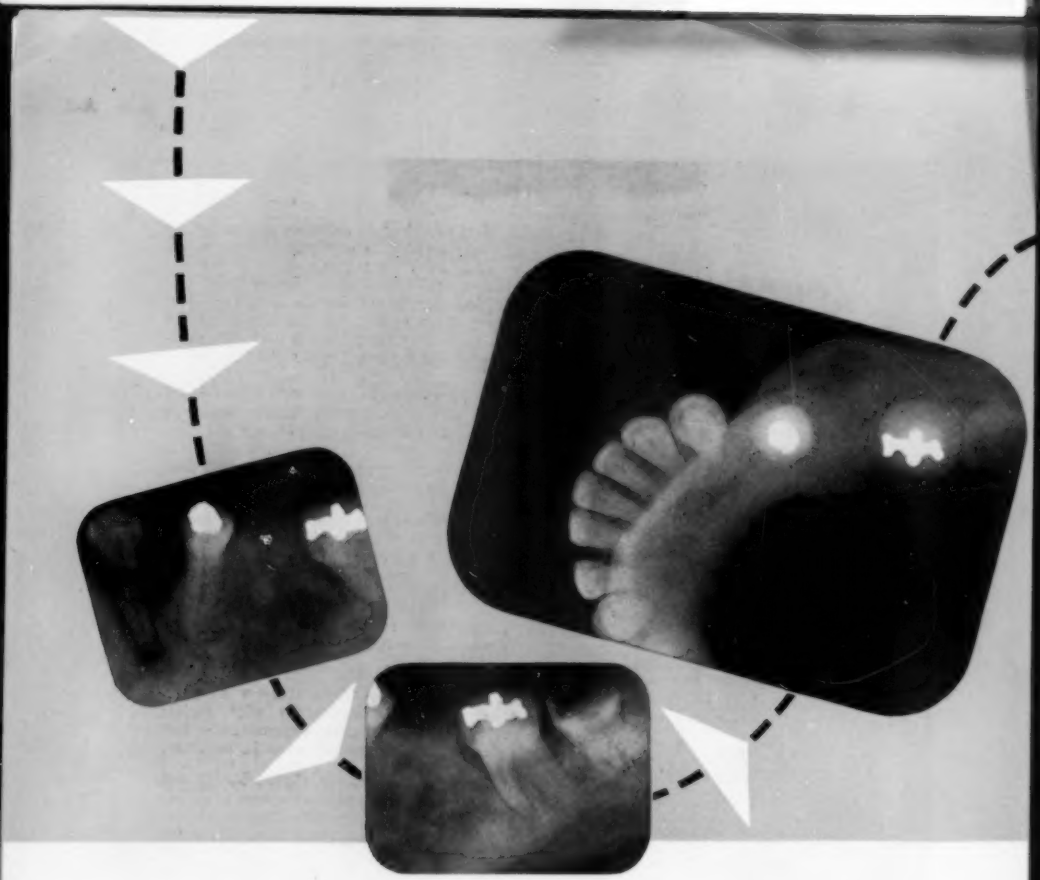

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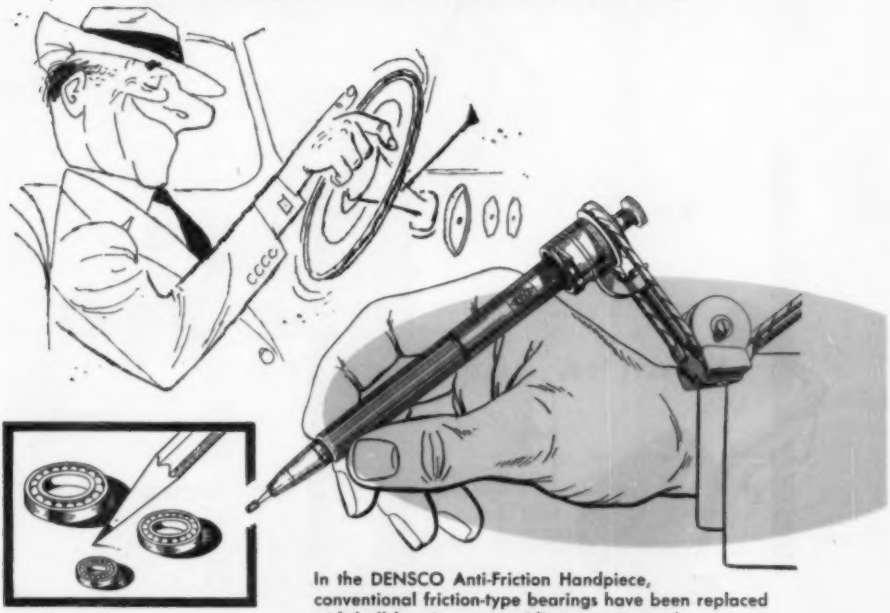

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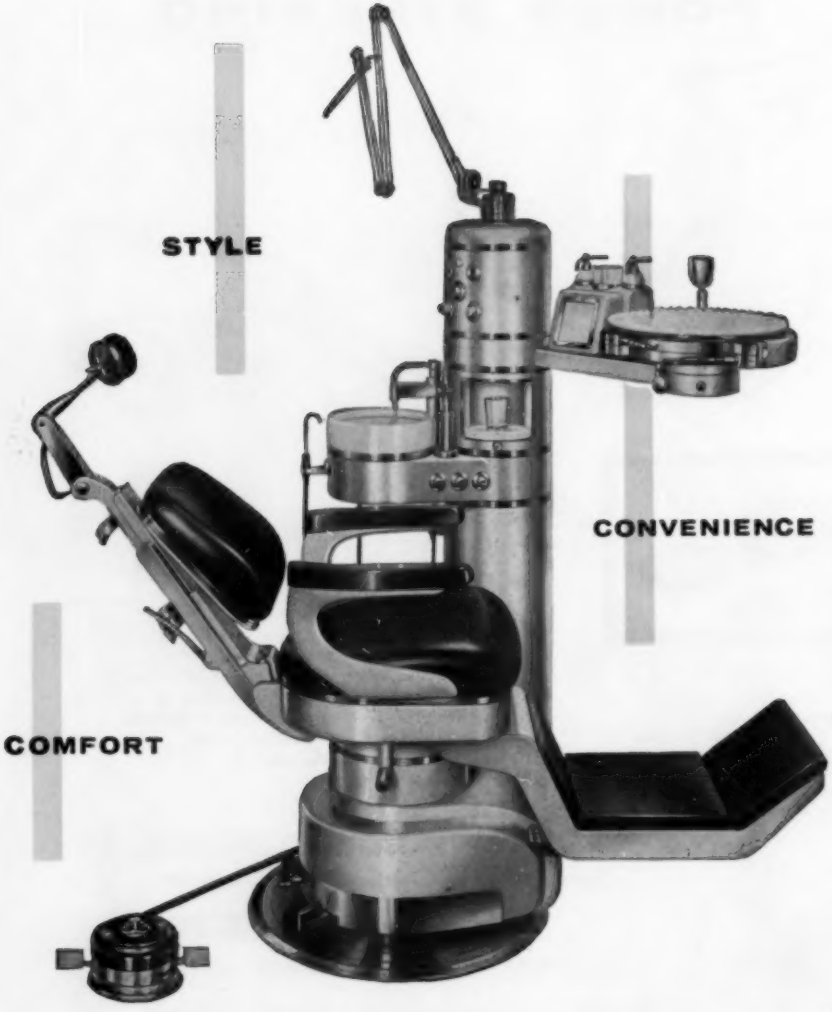
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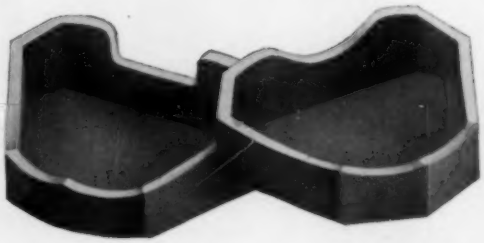

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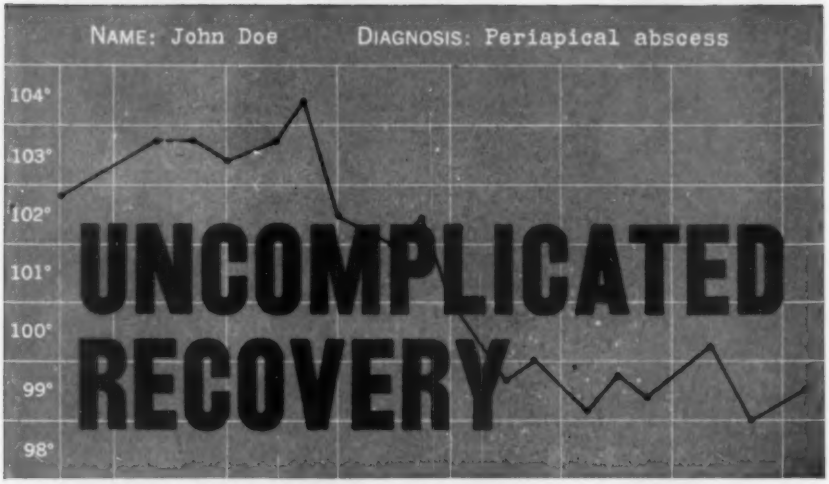

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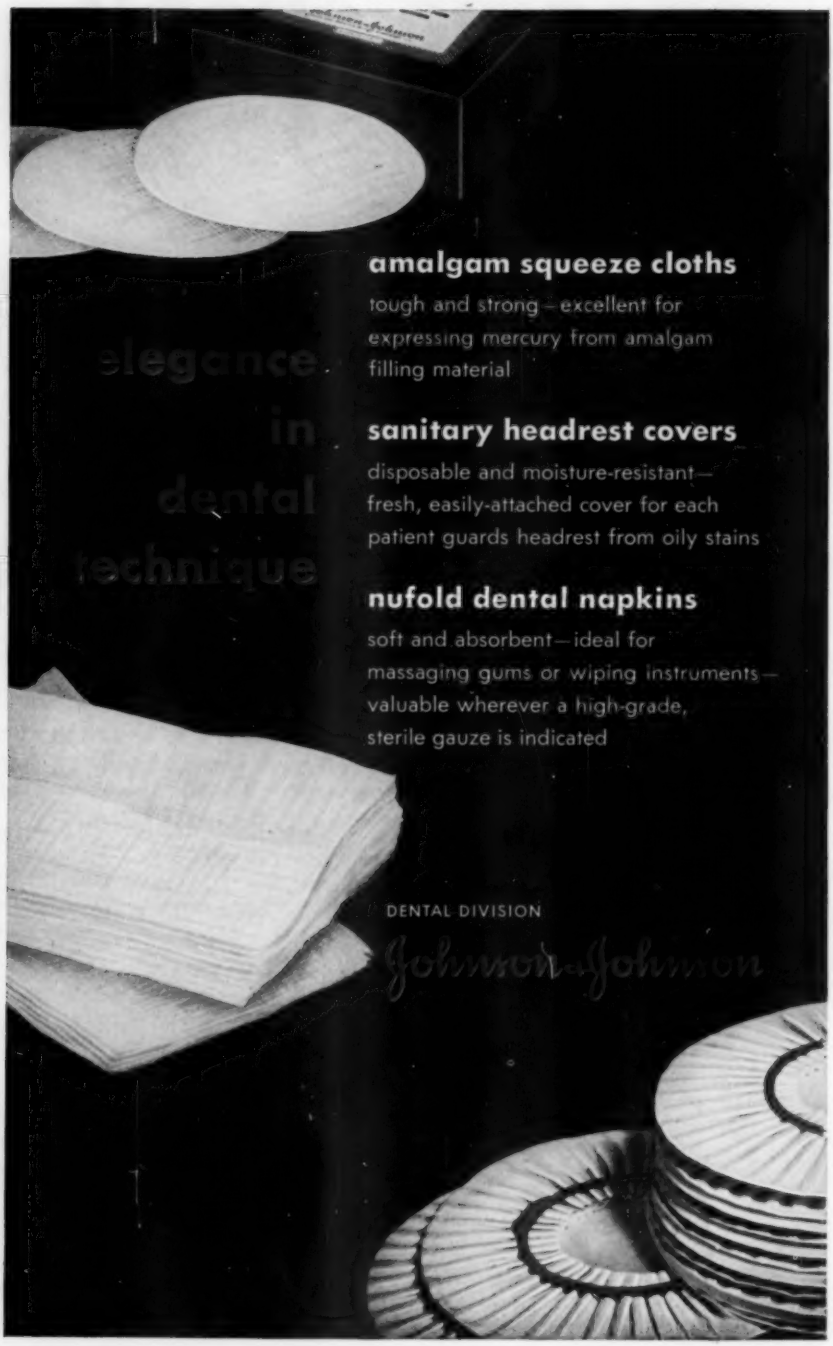
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APRIL 1956 VOLUME 52 • NUMBER 4

THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Review of 1955 dental research

Recognizing the fact that it is extremely difficult to keep abreast with all of the recent advances in dental research contained in the numerous publications and embracing the various fields of biological and physical sciences, the Council on Dental Research has prepared this review of current literature. Although it covers well over 200 research reports, it is obvious that some articles have been overlooked and others are only briefly mentioned.

Such a task would be impossible for one individual to accomplish both from the standpoint of time and competency in the various scientific disciplines which dentistry now embraces. To overcome these difficulties, the Council requested its consultants in the various areas of research to prepare the report covering their fields of special interest. The consultants and the fields of research covered in their reports are: Wallace D. Armstrong, medical aspects of fluoridation; William Lefkowitz, ultrasonics in dentistry; Dr. Tetsuo Shiota, microbiology; Seymour J. Kreshover, oral pathology; Harold J. Noyes, growth and development—orthodontics; Mr. Ralph W. Phillips and George C. Paffenbarger, dental materials; Dr. Harold C. Hodge, biochemistry; Reidar F. Sognnaes, caries research in laboratory animals, and W. Ward Wainwright, dental radiobiology.

It is the hope of the Council that these reviews of research reports published during the past 12 months will be of value to the oral clinicians. The efforts of the several authors, the editor of THE JOURNAL and the Council were put forth in the belief that the clinician might desire to have this material available for rapid review.

Although the knowledge gained in some of the studies reported cannot be applied immediately to therapeutic procedures, nevertheless it is desirable for the clinician to know what type of research is in progress. In the final analysis it is the clinician who has the most numerous and the closest contacts with the general public and therefore is in the position to inform and interpret to the public the efforts which dentistry is making to improve the understanding of disease processes and to develop methods for their prevention and improved treatment.

This review edited and collated by J. Roy Blayney, vice-chairman, Council on Dental Research.

DENTAL RADIOBIOLOGY

W. W. Wainwright, D.D.S., M.S., Los Angeles

In the United States, dental studies with radioisotopes have been reported in 174 publications. Recent advances have been surveyed in several reviews.[1-6] The functions of radiocalcium and radiophosphorus in the formation of enamel and dentin have been studied.[7-11] Radioautographs of decalcified sections showed permanent fixation of radiocarbon in the matrix. Radioisotopes have been applied to the following: the study of phosphatase activity in teeth[12] radiocalcium and alizarin deposition,[13] and radiocalcium deposits in both roentgenolucent and roentgenopaque areas of forming enamel.[14] Not only are minerals deposited in teeth by the process of calcification and by surface adsorption but there is also turnover of material from solid phase to surrounding liquid phase by the process of ion exchange.[15-24]

The rates of penetration of normal and pathologic tooth structure have been studied with several radioactive compounds. It has been shown that urea, acetamide, thiourea and nicotinamide rapidly penetrated to the dentoenamel junction,[25] acetamide at 37 degrees passed the dentoenamel junction to reach the enamel surface,[25] nicotinamide required several days to penetrate intact enamel.[26] Intact and carious enamel and sclerosed areas of dentin have been examined with radioactive iodine, calcium and phosphorus.[27-35] Nonfunctioning teeth take up greater amounts of radiophosphorus than do teeth in normal occlusion.[36, 37] Rats fed a diet deficient in phosphorus take up higher amounts of phosphorus in molars and incisors than do rats on a normal diet.[38] After it was shown that cadmium administration increased the amount of molar decay in rats, studies with the radioisotope showed that there was little uptake during tooth formation; however, when administered over a long period of time in drinking water, a layer of cadmium was adsorbed on the surface of the enamel.[39, 40]

Considerable control of marginal leakage[41] and penetration of silicate cement fillings by radioactive calcium chloride was obtained when careful technics were used.[42] Self-curing acrylic fillings showed less leakage when the brush technic was used.[43] Less leakage occurs around zinc phosphate cement fillings when a thick mix is used.[43] Amalgam fillings showed as much leakage as did gold inlays when they had been in the mouth for a period of several weeks to seven years before extraction.[44, 45]

Electrophoretic current moved radiocalcium ions from the floor of a cavity to the pulp chamber within 60 seconds.[46] Dow and Ingle studied the sealing properties of root canal fillings,[47] and Wach and co-workers[48] reported on dentin penetration by radioactive penicillin from the root canal.

Pumicing the tooth surface before topical fluoride application produces a much greater uptake of fluoride than simple scrubbing.[49] Almost all of the fluoride was removed by five seconds brushing with pumice. Fluorine is taken up on the surface of powdered enamel and dentin[50] by (1) exchange with carbonate; (2) adsorption; (3) precipitation of magnesium fluoride; (4) precipitation of calcium fluoride; (5) formation of fluorapatite.

Wallace-Durbin[51] reported that ingested fluorine is not deposited in the soft tissues of the rat with the possible exception of the kidney. There is some fecal excretion of radiofluorine. The distribution is the same whether fluorine is administered orally or by vein. The flu-

University of Southern California School of Dentistry.

oride content of bones and teeth is increased by feeding fluoride.[52] Administration of fluoride has no effect on the deposition of radioactive calcium.[53-54] The administration of acute or chronic doses of sodium fluoride does not affect thyroid iodine metabolism in rats.[55] Schneyer and Tanchester[56, 57] have reported on oral complications of the salivary glands after the administration of radioiodine. Salivary secretion and amylase activity are decreased in human beings. In one case these changes were followed by a rampant type of atypical caries. There was increased uptake of radioiodine in molar teeth of rats which had been traumatized by blows from a gold foil plugger.[58] Special technics have been developed for dental investigation: stripping emulsion radioautography,[59, 60] nuclear track radioautography for beta emitters,[61] network chart for radioautographic exposure time and minimum specimen activity,[62] Geiger-Mueller tube small enough to be introduced into the mouth,[63] radioiodine migrates in teeth stored at room temperature,[64] controlled by freezing.[64]

1. Bartelstone, H. J. Radioactive isotopes in dental science. Internat. D. J. 4:629 Sept. 1954.

2. Leicester, H. M. The biochemistry of the teeth. Ann. Rev. Biochem. 22:341, 1953.

3. Lussier, J. P. What has been contributed to dentistry by the radioactive isotopes? J. D. Med. 7:65 July 1952.

4. Martin, E. J. Radioactive isotopes in biological research. J. Ontario D. A. 30:220 July 1953.

5. Sognnaes, R. F. Enamel as a barrier to caries. Illinois D. J. 22:422 July 1953.

6. Wainwright, W. W. Dental uses of radioisotopes. Proc. U.N. Conference on Peaceful Uses of Atomic Energy, Geneva, Switzerland, August 1955.

7. Cremer, H. D.; Herr, W., and Späth, H. Nutritional factors in development of teeth and bones. Biochem. Ztschr. 32:212, 1951.

8. D'Iorio, A., and Lussier, J. P. Uptake of radioactive calcium by the dental tissues of the young rat. Rev. canad. biol., Montreal 10:175, 1951.

9. Greulich, R. C. and Leblond, C. P. Radioautographic visualization of the formation and fate of the organic matrix of dentin. J. D. Res. 33:859 Dec. 1954.

10. Leblond, C. P.; Belanger, L. F., and Greulich, R. C. Formation of bones and teeth as visualized by radioautography. A review. Ann. N. Y. Acad. Sci. In press, 1955.

11. Leblond, C. P., and Greulich, R. C. The development of bones and teeth; a radioautographic study. In Biochemistry and physiology of bone. Browne, G., editor. New York, Academic Press, in press, 1955.

12. Nicholas, L. W., and Denzler, G. J. Experimental procedures using radioactive isotopes in phosphatase studies. (Abst.) J. D. Res. 32:727 Oct. 1953.

13. Jarabak, J. R.; Kamins, M. M., and Vehe, K. L. Radioautographic study of the deposition of calcium[45] in the cranium, teeth and mandible. J.A.D.A. 47:639 Dec. 1953.

14. Myers, H. M. The location of radiocalcium in the mandibular incisor and adjacent structures of the rat. J. D. Res. 34:217 April 1955.

15. Amprino, R., and Camanni, F. Studio isotoradiografico ed autoradiografico dei tessuti calcificati del dente. Boll. Soc. Ital. Biol. Sper. 29:6 June 1953.

16. Belanger, L. F. Autoradiographic detection of radiosulphate incorporation by the growing enamel of rats and hamsters. J. D. Res. 34:20 Feb. 1955.

17. Belanger, L. F., and others. Autoradiographic visualization with Ca^{45} of normal growth of the incisor of pigs and the effect of fluorine feeding. Anat. Rec. 119:1:53 May 1954.

18. Boyd, H. B.; Zilversmit, D. B., and Calandruccio, R. A. The use of radioactive phosphorus, P^{32}, to determine the viability of the head of the femur. J. Bone & Joint Surg. 37-A:260 April 1955.

19. Cicardo, V. H., and Muracciole, J. C. Estudios sobre el metabolismo del calcio utilizando el isotopo radioactivo Ca^{45}. Revista Odontologica (Argentina) 42:192 May 1954.

20. Cremer, H. D., and others. Nutrition factors in tooth and bone development III. Deposition of radiophosphorus in teeth as well as in normal and fractured bones with varying mineral supply. Biochem. Ztschr. 324:337, 1953.

21. Dallemagne, M. J.; Fabry, C., and Bodson, P. The exchange of bone calcium with Ca^{45}. Experientia, Basel 11:142, 1955.

22. Eichler, O.; Appel, I., and Ritter, R. The metabolism of tooth germs and follicles in dogs, as revealed by the radioisotope p^{32}. Deut. zahnärztl. Ztschr. 8(11): 605, 1953.

23. Engfeldt, B.; Bergman, G., and Hammarlund-Essler, E. Studies on mineralized dental tissues. Microradiographic and autoradiographic investigation of teeth and tooth germs of normal dogs. Exp. Cell. Res. 7:381 Nov. 1954.

24. Sognnaes, R. F.; Shaw, J. H., and Bogoroch, R. Radiotracer studies. Am. J. Physiol. 180:408 Feb. 1955.

25. Wainwright, W. W., and Belgorod, H. H. Time studies of the penetration of extracted human teeth by radioactive nicotinamide, urea, thiourea and acetamide. II. Penetration of dentin from the pulp chamber. J. D. Res. 34:28 Feb. 1955.

26. Wainwright, W. W. Time studies of the penetration of extracted human teeth by radioactive nicotinamide, urea, thiourea and acetamide. I. Diffuse penetration from the enamel surface. J. D. Res. 33:767 Dec. 1954.

27. Ahlström, S.; Gedda, P. O., and Thulin, K. E. Studies on resorption and storing of iodine in brushing the teeth with tooth paste containing the radioactive iodine isotope I^{131}. Odontologisk Revy 4:210, 1953.

28. Bergren, H., and Cederberg, I. The translucent zone of the action in dentin. A radioautographic study. Arkiv för. Fysik. 4:565, 1952.

29. Boyd, J. D. Radioisotopes in the qualitative study of dentinal sclerosis. (Abst.) J. D. Res. 34:674 Oct. 1955.

30. Boyd, J. D., and Blum, A. D. Posteruptive maturation of teeth. I. Radioiodine uptake in ivory. (Abst.) J. D. Res. 33:702 Oct. 1954.

31. Cicardo, V. H., and Muracciole, J. C. La permeabilidad centripeta a de los tejidos dentarios con el isotopo radiactivo I^{131}. Rev. Asoc. Odontologica (Argentina) 43:44 Feb. 1955.

32. Ericcson, Y. The uptake of radioactive calcium and phosphate by intact and carious enamel surfaces. Acta Odont. Scandinav. 11:168 Sept. 1954.

33. Sernagiotto, G. C. Le vie di diffusione attraverso lo smalto. Rass. odontoiatr., Milano 34:1 Jan.-March 1953.

34. Stüben, J. Experimentelle Untersuchungen über die durchtrittszeit verschiedener Medikamente durch Dentin, gemessen mit der Schlierenmethode. Deut. Zahnärztl. Ztschr. 8:12 June 15, 1953.

35. Wainwright, W. W., and others. Deposition of radioactive iodine in teeth of persons treated for disease of the thyroid gland. J.A.D.A. 47:649 Dec. 1953.

36. Neumann, H. H., and DiSalvo, N. A. Effect of chewing on the phosphorus exchange in teeth. J. D. Res. 33:801 Dec. 1954.

37. Neumann, H. H. Work hardening of the enamel. (Abst.) J. D. Res. 34:715 Oct. 1955.

38. Myers, H. M. The comparative turnover rate of P^{32} in normal and deficient rats' teeth and bones during recovery from phosphorus deficiency. J. D. Res. 34:225 April 1955.

39. Leicester, H. M.; Thomassen, P. R., and Denzler, G. J. Tracer studies on the uptake of cadmium in the rat molar. J. D. Res. 32:663 Oct. 1953.

40. Thomassen, P. R. The role of phosphate inhibitors in dental caries. (Abst.) J. D. Res. 32:727 Oct. 1953.

41. Schnepper, H. E. A study of methods of measuring marginal penetration of dental restorations with emphasis on the use of radioactive phosphorus. Thesis. University of Washington, 1954.

42. Harris, I. T. The cavity sealing properties of silicate cement. (Abst.) J. D. Res. 32:652 Oct. 1953.

43. Brown, D. W. The cavity-sealing properties of autopolymerizing acrylic and zinc phosphate cement. (Abst.) J. D. Res. 32:652 Oct. 1953.

44. Crawford, W. H. Fluid penetration between fillings and teeth using Ca^{45}. J. D. Res. 33:694 Oct. 1954.

45. Crawford, W. H., and Larson, J. H. Dental restorative materials: amalgams, acrylics. J. D. Res. 33:414 June 1954.

46. Sausen, R. E. Electrophoresis in dentin with radioactive calcium. J. D. Res. 34:12 Feb. 1955.

47. Dow, P. R., and Ingle, J. I. Isotope determination of root canal failure. Oral Surg., Oral Med. & Oral Path. 8:1100 Oct. 1955.

48. Wach, E. C.; Hauptfuehrer, J. D., and Kesel, R. G. Endodontic significance of the penetration of S^{35} labeled penicillin in extracted human teeth. Oral Surg., Oral Med. & Oral Path. 8:639 June 1955.

49. Hein, J. W., and others. In vitro studies of the uptake of fluoride on teeth surfaces from 1 ppm radioactive fluoride solutions. J. D. Res. 33:661 Oct. 1954.

50. McCann, A. G., and Bullock, F. A. Reactions of fluoride ion with powdered enamel and dentin. J. D. Res. 34:59 Feb. 1955.

51. Wallace-Durbin, P. The metabolism of fluorine in the rat using F^{18} as a tracer. J. D. Res. 33:789 Dec. 1954.

52. Likins, R. C., and others. The effect of fluorine on the deposition of radiocalcium in the rat. (Abst.) J. D. Res. 33:670 Oct. 1954.

53. Likins, R. C., and others. The effect of prior fluorine exposure on the deposition of radiocalcium in the rat. J. D. Res. 33:711 Oct. 1954.

54. Gordonoff, T., and Minder, W. Versuche mit Ca^{45} zum caries fluor-problem. Helvet. physiol. pharmacol acta 9:C24, 1951.

55. Harris, N. O. Tracer study of the effect of acute and chronic exposure to sodium fluoride on the thyroid iodine metabolism of rats. J. D. Res. 33:661 Oct. 1954.

56. Schneyer, L. Effect of administration of radioactive iodine on human salivary gland function. (Abst.) J. D. Res. 32:146 Feb. 1953.

57. Schneyer, L. H., and Tanchester, D. Some oral aspects of radioactive iodine therapy for thyroid disease. New York J. Den. 24:308 Aug.-Sept. 1954.

58. Ash, M. M. Radioiodine in traumatized rat molars. (Abst.) J. D. Res. 34:669 Oct. 1955.

59. Boyd, G. A. Autoradiography. New York, Academic Press, 1955.

60. Bartelstone, H. J., and Wolff, H. Stripping emulsion radioautography of I^{131} uptake in human teeth (in vitro) (Abst.) J. D. Res. 32:636 Oct. 1953.

61. Kinersly, T. Beta-track autoradiographic study of teeth with Ca^{45}. Yale J. Biol. 27:114 Nov. 1954.

62. Wainwright, W. W., and others. Simplified autoradiography exposure calculation. Nucleonics 12: 19 Jan. 1954.

63. Neumann, H. H., and DiSalvo, N. A. Measurement of enamel radioactivity within the mouth. (Abst.) J. D. Res. 32:725 Oct. 1953.

64. Butt, B. G., and Hauptfuehrer, J. D. Control of postmortem changes in radioiodine distribution in teeth. (Abst.) J. D. Res. 33:651 Oct. 1954.

ULTRASONICS IN DENTISTRY

William Lefkowitz, D.D.S., Columbus, Ohio

In industry ultrasound has many uses such as cavitation, dispersion and emulsification; also it is used as a chemical catalyst, for aggregation, and for testing materials. In all instances save the latter two, heat is generated since the energy output is too slight to cause perceptible thermogenesis. In the practice of medicine, it is advocated for therapy, diagnosis and for biologic measurements. It is the most recent addition to dental procedures[1] and has been recommended for a wide variety of dental operations.

The development of the use of ultrasound in medicine is parallel to its development in dentistry. Originally advocated as a therapeutic agent in 1928, it became extremely popular in Europe, reaching a peak in 1945. Since then, competent investigators have found objections to its indiscriminate use, and the more conservative practitioners, heeding the numerous laboratory reports, are advocating a more cautious approach.

Herrick and Krusen[2] published an illuminating survey of the existing medical literature. They state that ultrasound

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is an excellent heating agent for structural heating of bodily tissues. In reviewing the early events of ultrasound therapy, they note a wave of enthusiasm regarding its possibilities followed by an inevitable wave of pessimism. After early biological research, the atmosphere partially cleared and, at present, ultrasound is a subject for careful study. It has been found useless for the selective destruction of malignant tissue.[3]

In applying ultrasound to bones, extreme heat may be generated and areas of necrotic bone may occur. The growth of growing bones is inhibited by ultrasound.[4] Nerves are heated by ultrasound and lose their ability to conduct impulses;[5] this effect is now under investigation for possible use in analgesia.[6] In diagnosis, the successful location of foreign bodies has been reported.[7] The method is similar to the testing of materials in industry. Ultrasound is also used for measuring the velocity of blood[8] and other phenomena.[9, 10] Control of keloid growth by ultrasonic energy was reported in two cases.[11] By focusing a beam of ultrasound in the brains of cats, destructive lesions were produced in the brain without injuring the overlying tissue.[12] Attempts to liquefy the vitreous humor of rabbit eyes as an approach to the problem of vitreous hemorrhage resulted in injurious effects on other ocular tissues.[13] In an effort to determine if the effect of ultrasound is purely physical, Gersten[14] investigated hydration changes in muscle and tendon and found that the water content of muscle increases and tendon decreases in an ultrasound field. Authors, recommending therapy, advise their readers of possible dangers in the use of ultrasonic energy and the need of a dosage table and further research.[15-18]

Ultrasonics is relatively new as a dental adjunct. It is used mainly to remove hard substances by cavitation. Oman and Applebaum,[1] in a preliminary report, advocated ultrasound for cavity preparation. Here, it was claimed, was an instrument capable of vibrating a preformed restoration to place painlessly without noise or vibration.[1] After this publication, five articles appeared in lay publications informing the public of the use of ultrasonics in dentistry.[19-23]

A further report on the clinical use of ultrasonics was made by Oman before the New York Academy of Dentistry in which he claimed virtually painless cavity preparation with specially designed working points. The report stated that inflammatory changes in the pulps of teeth were about the same as those produced by rotary instruments, and that preparations in 52 patients were without complication.[24]

In March 1955, the first report on pulp response was made at the meeting of the International Association of Dental Research which indicated severe pulp injury.[25] The guinea pig incisor was the experimental tooth. At the same meeting a report advocating the use of an ultrasonic dental instrument in periodontics was made.[26]

In April 1955, an experimental ultrasonic dental instrument was described and methods of use and recommendations for research were discussed.[27] At the same time studies of its physical characteristics were reported.[28] It is interesting to note that the author recommended caution until biologic studies were made.

The suggestion that prefabricated inlays could be vibrated into a tooth had been dropped by April 1955.[29] After this report, the manufacturer published reports and news letters on technical aspects, clinical data and technics, with not a single instance of postoperative complication reported.[30-33] In the May 1955 issue of THE JOURNAL, the American Dental Association's Council on Dental Research published a report[34] stating that a review of available evidence suggests that the ultrasonic method of cavity preparation and the use of ultrasonic

therapy in the treatment of oral disease are in the experimental stage and that patients should be so advised. The manufacturer followed this with a letter dated July 8, 1955,[35] in which it was stated that no deleterious effects had been observed in pulps or hard structures. It is interesting to note that the only histologic data presented to date was that of Hansen and Nielsen.[25] A "Letter to the Editor" on the use of the ultrasonic drill[36] extolled its use but suggested that it is not the final word in cavity preparation.

At the American Dental Association meeting in San Francisco, William H. Crawford reported that thermogenesis at nodal points occurred when cavities were prepared with ultrasound. Critical temperature rises were recorded at distances from the point of application of the instrument. Arne Nielsen reported pulp injury caused by a commercial ultrasonic unit as similar to that which had been found when his original equipment was used.[25] The experimental animal was the guinea pig. William Lefkowitz reported that the ultrasonic instrument was limited in its use for cavity preparation, was slower than conventional speed rotating instruments, and was still experimental as far as technic was concerned. All essayists expressed the opinion that more investigation was necessary before ultrasonics be adopted for clinical use.

Medical investigations in the use of ultrasound cannot be literally applied to dentistry. Not only is the application and purpose different, but the energy output varies considerably. In general, higher frequency results in low amplitude. Medical ultrasonic equipment, having 800,000 to 2,000,000 cycles has a low amplitude. The dental ultrasound equipment having only 29,000 cycles has a high amplitude.

These differences make it impossible to translate the results of medical research to dental use for the removal of dentin and enamel. The ultrasonic research in medicine[2, 4-8, 12, 14] should serve not only to emphasize the need for similar investigation with a low frequency high amplitude instrument but also for additional research regarding its effect on dental tissues.

1. Oman, C. R., and Applebaum, E. Ultrasonic cavity preparation: preliminary report. New York D.J. 20:256 June-July 1954.

2. Herrick, J. F., and Krusen, F. H. Ultrasound and medicine. A survey of experimental studies. J. Acoust. Soc. 26:236 March 1954.

3. Schroder, J. D.; Herrick, J. F., and Karlson, A. G. The effect of ultrasound on the transmissible walker rat carcinoma. Arch. Phys. Med. 33:660 Nov. 1952.

4. DeForest, R. E., and others. Effects of ultrasound on growing bone. Arch. Phys. Med. 34:21 Jan. 1953.

5. Rosenberger, H. Uber den Wirkungsmechanismus der Ultraschallbehandlung, insbesondere bei Ischias und Neuralgien. Chirurgie 21:404 July 1950.

6. Anderson, T. P., and others. An experimental study of the effects of ultrasonic energy on the lower part of the spinal cord and peripheral nerves. Arch. Phys. Med. 32:71 Feb. 1951.

7. Ludwig, G. D., and Struthers, F. W. Report no. 4, Project NM004 001, Naval Medical Research Institute, 1949.

8. Kalmus, H. P. Nat. Bureau of Standards Tech. News Bull. 37:30, 1953.

9. Roth, W., and Rich, S. R. A new method for continuous viscosity measurement, general theory of the Ultra-Viscoson. J. Applied Physiol. 24:940, 1953.

10. Wild, J. J. Use of ultrasonic pulses for measurement of biologic tissues and the detection of tissue density changes. Surgery 27:183 Feb. 1950.

11. Kuitert, J. H., and others. Control of keloid growth with ultrasonic energy; report of two cases. Am. J. Phys. Med. 34:408 June 1955.

12. Fry, W. J., and others. Ultrasonically produced localized selective lesions in the central nervous system. Am. J. Phys. Med. 34:413 June 1955.

13. Donn, A. Ultrasonic wave liquefaction of vitreous humor in living rabbits. A.M.A. Arch. Ophth. 53:215 Feb. 1955.

14. Gersten, J. W. Changes in hydration of muscle and tendon following the application of ultrasonic energy. Arch. Phys. Med. & Rehab. 36:140 March 1955.

15. Schwartz, F. F. Ultrasonics in treatment of rheumatism. Rheumatism 11:16 Jan. 1955.

16. Curwen, I. H. M. Current therapeutics LXXXVI. Ultrasonics Practitioner 174:216 Feb. 1955.

17. Kuitert, J. H., and Harr, E. T. Introduction to clinical application of ultrasound. Phys. Therapy Rev. 35:19 Jan. 1955.

18. Lehman, J. F., and others. Present value of ultrasonic diathermy. J.A.M.A. 157:996 March 19, 1955.

19. United Press release, New York, July 8, 1954.

20. Teeth drilled painlessly by noiseless ultrasonics. Science News Letter 66:41 July 17, 1954.

21. Open wider—the Cavitron. Time 64:65 July 19, 1954.

22. Just relax, the Cavitron. Newsweek 44:80 July 19, 1954.

23. Cooley, D. G. New dental drill does not hurt. Better Homes & Gardens 32:42 Oct. 1954.

24. Oman, C. R. Further report on the use of ultrasonics in dentistry. Read before New York Academy of Dentistry, Nov. 18, 1954.

25. Hansen, L. S., and Nielsen, A. G. Comparison of tissue response to rotary and ultrasonic dental cutting procedures. J.A.D.A. 52:131 Feb. 1956.

26. Zinner, D. D. Use of ultrasonic instrument in periodontia. Preprinted abstracts, International Association of Dental Research meeting, Chicago, March 1955.

27. Nielsen, A. G.; Richards, J. R., and Wolcott, R. B. Ultrasonic dental cutting instrument. I. J.A.D.A. 50:392 April 1955.

28. Nielsen, A. G. Ultrasonic dental cutting instrument. II. J.A.D.A. 50:399 April 1955.

29. Oman, C. R., and Applebaum, E. Ultrasonic cavity preparation. II. Progress report. J.A.D.A. 50:414 April 1955.

30. Balamuth, L. Technical aspects of the Cavitron ultrasonic process in dentistry. Cavitron Equipment Corporation, Long Island City, N. Y., March 23, 1955.

31. Dental preparation with ultrasonics. Cavitron Equipment Corporation, Long Island City, N. Y.

32. Initial report on nationwide program of biological and clinical investigation of the Cavitron dental unit. Cavitron Equipment Corporation, Long Island City, N. Y.

33. Cavitron research newsletter no. 2. Cavitron Equipment Corporation, Long Island City, N. Y., June 1955.

34. American Dental Association, Council on Dental Research. Ultrasonics in dentistry. J.A.D.A. 50:573 May 1955.

35. Form letter, July 8, 1955. Cavitron Equipment Corporation, Long Island City, N. Y.

36. Wasserman, J. B. Report on the ultrasonic drill. D. Survey 31:1442 Nov. 1955.

MICROBIOLOGY

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Recently a report[1] described a new technic in the field of caries research. This was the use of the germfree animals maintained at Lobund laboratories. Rats reared on cariogenic diet in a bacteria-free environment developed no caries, whereas rats inoculated with known bacteria, in which an enterococcus was the predominating microorganism, all developed caries. That caries susceptibility in rats is a possible genetic factor is brought forth by a paper[2] dealing with the prevalence of certain bacteria in the mouths of caries-susceptible and non-susceptible rats. The results indicated that lactobacillus and *Streptococcus salivarius* appeared with greater frequency in the caries-susceptible rats. The effect of fluoridation on salivary lactobacillus counts among children in the Evanston caries study[3] was a shift in the distribution of children with high, moderate and low lactobacillus counts before and after fluoridation. Children with lower lactobacillus counts had lower untreated carious surface rates than had children with greater lactobacillus counts. Kitchin and Permar[4] showed that salivary lactobacillus counts decreased when carbohydrates were restricted from diets of human beings over a period of time.

ORAL FLORA

Williams,[5] in a review of the effects of carbohydrates in the oral flora, covers several areas which are of interest. He states that the lactobacillus population is the only one in the oral flora which has been studied extensively in relation to dietary effects. Furthermore, he suggests that the interrelationships of oral microorganisms are important and should be studied. There have been two reports claiming the presence of actinomyces in the mouth. One report[6] claimed that this microorganism was found in a closed pulpal abscess of a patient who damaged two upper incisors in a fall. Ludwig[7] found actinomyces from a lesion of the soft tissues in the maxillary region and identified it as *Actinomyces israeli*. Davies and Nemes[8] obtained several anaerobic cultures from three depths of carious dentin and from root canals. These organisms were described as gas-producing, facultative and obligate anaerobes and both rods and cocci. Kasai[9]

National Institute of Dental Research, National Institutes of Health, Fellowship Division of the Council on Dental Research of the American Dental Association.

reported the development of a bacterial culture medium for the isolation and cultivation of nonbranching filamentous anaerobes from the mouth. The difficulty of growth and maintenance of these microorganisms is discussed. The recovery of tubercle bacilli from mouths of persons with active pulmonary tuberculosis was made by Abbott, Briney and Denaro[10] and indicates that dentists and their assistants should take necessary precautions.

METABOLISM OF ORAL BACTERIA

Several papers appeared in the literature dealing with the metabolism of oral microorganisms. Lucas and Thonard[11] isolated microorganisms from gingival pockets of persons with periodontal disease. About half of those isolated were capable of attacking collagen *in vitro*. Another biochemical process carried out by microorganisms is the synthesis of high molecular compounds. Snyder and others[12] found two types of oral bacteria capable of synthesizing mucinous polysaccharides from sucrose, *Streptococcus salivarius* which synthesized levan and a gram-negative diplococci which produced amylopectin.

Of the various areas of research in microbial metabolism, probably the one receiving the greatest attention is that dealing with glycolysis. Clapper and Heatherman[13] reported the metabolic activity of two strains of lactobacilli. Type I was shown to have a greater glycolytic activity than Type II. Wagg[14] made a study on the lactic acid production by oral lactobacilli and streptococci and found the various methods of lactic acid determinations to be unsatisfactory. The ability of oral lactobacilli to form acids from various sources of sugars was studied by Lennon and Sullivan[15]. They found that natural forms of sugar products containing monosaccharides, such as golden syrup, honey and treacle, fermented more rapidly than disaccharides. When materials obtained from activated saliva were used to ferment the various sources of sugars, however, there was no apparent difference in the rate of acid production. The study on the effect of scaling, and polishing of teeth on the metabolic activity of salivary flora[16] showed that this operation produced no difference on the ability of saliva to ferment sugars. In a study, inhibition of glycolysis in yeast by sodium-N-lauroyl sarcosinate[17] was found to be due to the inhibition of the glycolytic enzymes hexokinase and aldolase.

ANTIBIOTICS AND CHEMOTHERAPY

There are several reviews discussing the use of antibiotics and chemotherapeutic agents. One deals with the use of antibiotics in dental surgery,[18] another in connection with infection of a pyogenic nature, that is, acute alveolar abscess, osteomyelitis and ulceromembranous stomatitis[19] and the third[20] discusses the possible harmful effects, such as drug toxicity and hypersensitivity. Turkheim[21] studied the bactericidal effect of zinc oxide-eugenol cement on microorganisms. Pure cultures of *Streptococcus pyogenes aureus, Lactobacillus acidophilus odontolyticus, Escherichia coli* and *Candida albicans* were all inhibited while bacteria from natural decay material from extracted carious teeth were resistant. The study on the sensitivity of oral lactobacillus toward antibiotics[22] showed that this microorganism varied in its sensitivity to the various antibiotics. Furthermore, the oral lactobacillus can develop a tolerance to the inhibitory concentrations of penicillin, erythromycin, and others when cultured repeatedly in the presence of these antibiotics.

1. Orland, Frank J., and others. Experimental caries in germfree rats inoculated with enterococci. J.A.D.A. 50:259 March 1955.

2. Rosen, S., and others. Microbiologic differences in the oral cavities of the Hunt-Hoppert caries-resistant and caries-susceptible rats. J. D. Res. 34:113 Feb. 1955.

3. Hill, Iden N. Evanston dental caries study. XII. A survey of lactobacillus counts with reference to untreated carious surfaces before and after exposure to fluoridated water. J. D. Res. 34:178 April 1955.

4. Kitchin, Paul C., and Permar, Dorothy. Results of an eight-year study of the effectiveness of carbohydrate restriction in reducing salivary lactobacillus counts. J. D. Res. 34:89 Feb. 1955.

5. Williams, Ned B. Effect of sugars and other carbohydrates on the oral flora. J.A.D.A. 51:278 Sept. 1955.

6. Hardwick, J. L., and Newman, P. A. A closed pulpal abscess associated with actinomyces-type organisms. Brit. D. J. 98:166 March 1955.

7. Ludwig, T. G. Actinomycosis originating in the maxillary region. Oral Surg., Oral Med. & Oral Path. 8:877 Aug. 1955.

8. Davies, E. E., and Nemes, J. L. Anaerobic bacteria in carious dentin. Oral Surg., Oral Med. & Oral Path. 8:526 May 1955.

9. Kasai, G. J. Study of mediums for the growth and isolation of filamentous mouth organisms. J. Infect. Dis. 96:279 May-June 1955.

10. Abbott, John N.; Briney, Alonzo T., and Denaro, Salvatore A. Recovery of tubercle bacilli from mouth washings of tuberculous dental patients. J.A.D.A. 50:49 Jan. 1955.

11. Lucas, R. B., and Thonard, J. C. Action of oral bacteria on collagen. J. D. Res. 34:118 Feb. 1955.

12. Snyder, Marshall L., and others. Synthesis of mucinous polysaccharides from sucrose by oral bacteria. J. D. Res. 34:368 June 1955.

13. Clapper, William E., and Heatherman, Mary E. Metabolic studies of a type of lactobacillus associated with caries. J. D. Res. 34:380 June 1955.

14. Wagg, B. J. Determination of lactic acid produced by oral lactobacilli and streptococci when grown in chemically undefined media. Brit. D. J. 99:109 Aug. 16, 1955.

15. Lennon and Sullivan, H. R. Relative rates of acid production from "refined" and "natural sugars." D. J. Australia 27:67 April 1955.

16. Hartles, R. L., and Wasdell, Marie R. Metabolism of oral flora. 5. The effect of scaling and polishing the teeth on the respiration and acid production occurring in whole saliva. Brit. D. J. 98:77 Feb. 1, 1955.

17. Carbon, John A., and others. Inhibition of anaerobic glycolysis by sodium N-lauroyl sarcosinate. Arch. Biochem. 55:356 April 1955.

18. Hampson, E. L. Chemotherapy and antibiotics in dental surgery. D. Practitioner 5:147 Jan. 1955.

19. Cahn, Lester R. Oral infections: the evolution of their treatment. Brit. D. J. 98:245 April 1955.

20. Jawetz, Ernest. The rational use of antimicrobial agents. Reason versus emotion in chemotherapy. Oral Surg., Oral Med. & Oral. Path. 8:982 Sept. 1955.

21. Turkheim, H. J. In vitro experiments on the bactericidal effect of zinc oxide eugenol cement on bacteria-containing dentin. J. D. Res. 34:295 April 1955.

22. Dreizen, Samuel, and others. Studies on the development of tolerance to selected antibiotics by susceptible oral lactobacilli. J.A.D.A. 51:338 Sept. 1955.

ORAL PATHOLOGY

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Although dental caries continues to attract a major portion of the attention of the dental profession, a more equitable distribution of research activities to include a wider horizon of oral health problems is desirable. It is rather tempting to speculate that the more recent literature is indicative of a newer, more realistic concept of the scope of dental research.

PERIODONTAL DISEASE

Perhaps one of the most notable observations to be made from a review of the recent literature in the general field of oral pathology is the increasing attention given to the subject of periodontal disease.

Many investigators, recognizing that a clearly defined anatomic picture of organs and tissue sites is essential to an understanding of the pathogenesis of disease processes, have directed their attention to a study of the so-called epithelial attachment as well as other periodontal tissues. Keller and Cohen,[1] attempting to demonstrate the blood supply of the gingivae and periodontium by a technic of india ink perfusion, suggest that such questions as the effect of occlusal traumatic forces on the circulation of the gingivae and the vascular patterns of the attachment apparatus may be elucidated. Waerhaug has pointed out that in all surface epithelium there is a constant formation of new cells in the stratum germinativum and a corresponding desquamation of degenerated cells on the surface. The suggestion is made that the attachment is one of a cufflike con-

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tact or adhesion with the tooth surface rather than a true organic union.[2] Some credence may be given this hypothesis in light of the observation that pocket epithelium may assume a relation to an artificial crown or replanted tooth which is almost identical to that present in natural teeth.[2-4] Further supporting this concept of the epithelial attachment is the study by Arnim[5] of serial sections of partially demineralized human, rat and monkey jaws in which the healthy gingiva was found to be physiologically adapted to the tooth surface by a dense, fibrous tissue.

Butcher and Vidair[6] subjected the extracted permanent incisors of monkeys to such rigorous treatment as grinding away of the cementum and superficial dentin of the roots, and immersion in Formalin, alcohol and hot water prior to replantation. Although it could not be determined whether epithelial downgrowths can cause loss of fiber attachment, or whether the fibers must be lost before epithelium can proliferate, it was established that reattachment occurred through the formation of cementum into which was engulfed the free ends of periodontal fibers. A similar picture of reattachment in dogs was reported by Linghorne and O'Connell.[7] Carrying their study somewhat further, however, these investigators considered the controversial issue of whether reattachment can occur in the presence of an epithelized pocket. Evidence was presented that such reattachment does occur, and it was hypothesized that the mechanism is one of proliferation of cementoblasts just apical to the epithelial attachment which thereby causes coronal displacement of the latter structure.

In order to make a more complete review of the subject of periodontal pockets, a consideration of etiologic factors is necessary. Glickman and Weiss,[8] using dogs in which a cast metal onlay was affixed to the maxillary anterior teeth, could show no histologic evidence of periodontal pocket formation during an experimental period of 110 days. The authors are careful to indicate, however, that this finding is related to the question of initiation of the lesion and should not be accepted as evidence that trauma has no influence on the deepening of pockets already present. Waerhaug[9] further explored this problem in an effort to determine whether long standing and repeated occlusal stress can lead to a deepening of previously established pockets, and if so, the extent of the deepening. He reported extensive involvement beyond the cementoenamel junction in seven dogs observed for a period of 23 to 275 days.

Inasmuch as a principal cause of periodontal pockets is calculus, attention may be called to two interesting studies by Shroff[10] and Waerhaug.[11] Shroff's report is primarily concerned with the strength of attachment at different levels of the tooth surface. It is generally agreed that various microorganisms, particularly the actinomyces and leptothrix, are responsible for the formation of the organic matrix of calculus; however, there is no uniformity of opinion regarding the source of mineral salts in subgingival deposits. Waerhaug used selected human patients with extensive subgingival calculus and exposed the gingival margins of the pockets to such dyes as methylene blue and alizarin red. Inasmuch as no dye had penetrated below the gingival margin after a lapse of 6 to 10 hours, it was concluded that saliva might have comparable difficulty in penetration. This interpretation of findings was stated by the author to afford evidence that the blood provides the source of mineral salts in subgingival calculus.

In a consideration of other factors that might predispose to periodontal disease, rather considerable attention has been given of late to the subject of protein deficiency. Bavetta and Bernick[12] found that relatively little information was available on the consequences of the lack

of single, indispensable amino acid on oral tissues; therefore they subjected rats to a lysine-poor diet. Although alveolar bone loss associated with disorganization of attachment fibers was observed after a seven week period, repletion of lysine brought about changes which indicated the lesions were reversible. A question may be raised, however, regarding the comparable influence of protein deficiency on irritated periodontal tissues. Stahl, Sandler and Cahn[13] explored this subject and reported that an irritant around the teeth of rats maintained on a normal, adequate diet caused a flattening of the interdental papillae with but moderate inflammatory reaction and no noticeable resorption of alveolar bone. On the other hand, the same irritant applied to protein-deprived animals caused a degeneration of connective tissue fibers and considerable resorption of alveolar bone. A further interesting observation was the periapical destruction that followed exposure of pulp in the protein deficient group, and the contrasting limitation of inflammation to the pulp in the control group.

The role of bacteria as injurious agents cannot be neglected in any consideration of periodontal disease. A most significant contribution in this regard was made by Schultz-Haudt, Bibby and Bruce.[14] After having demonstrated the existence of two tissue-destructive agents, one in extracts prepared from inflamed gingival tissue and the other in cell-free extracts of gingival bacteria, it occurred to these workers that other such agents may be identified in bacteria-free filtrates. It was found, in preparing filtrates from gingival bacterial deposits from persons with gingivitis, that enzymes with the capacity to act on hyaluronic acid, chondroitin sulfate and collagen were present. However, no active agents were identified in filtrates prepared from deposits of clinically normal gingiva. As a result of these findings, it was suggested that the isolated enzymes serve as exogenous predisposing factors in the development of gingivitis, and that the cause of such lesions is not entirely local irritation, whether traumatic or otherwise.

In the field of treatment of periodontal disease, a number of publications in recent years have described the reputedly epithelium-specific solvent effect of Antiformin. Hunter[15] and Glickman[16] took issue with such dogmatic assertions. Each demonstrated in histologic preparations of periodontal pockets that this drug is a nonspecific necrotizing agent that destroys connective tissue as well as epithelium. It appears that more conservative and controllable methods for removal of injurious agents and necrotic tissue are to be preferred.

SOFT TISSUE LESIONS

In keeping with the responsibility of the dental practitioner for all structures of the oral cavity, a number of studies, not specifically related to the periodontium or teeth, have been reported in the recent literature. Afonsky[17] noted that the tongue lesions associated with vitamin B complex deficiency as well as nutritional anemias and various gastrointestinal disturbances are frequently characterized by similar features of papillary atrophy and inflammation. He, therefore, decided a re-evaluation was needed as to whether specific vitamin deficiencies might elicit characteristic oral manifestations. His observation in dogs that lesions resulting from niacin, riboflavin, pyridoxine, folic acid and pantothenic acid deficiency had many features in common affords confirmatory evidence that such oral manifestations are neither specific nor pathognomonic.

A rather different approach to the problem of tongue manifestations in systemic disease is presented by Squires.[18] He contends that photography does not provide an easily decipherable record of either the normal or the diseased tongue and presents a method by which prints of

the tongue surface are taken with a special ink. Based on certain predominating features observed in 1,098 apparently healthy persons of European and African origin, these prints were classified into major types. Although the practical value of this technic may be questioned, the author indicates that he has used it to follow mucosal regeneration in patients treated for deficiency and other diseases showing papillary atrophy. A perhaps more significant aspect of this study may be found in the observation that no two tongues in the series produced the same printed pattern. Should further study confirm this observation, it may be of some interest to the field of forensic medicine.

A study of more practical significance is that of Smith and Bains[19] who evaluated the problem of denture sore mouth. Based on the failure of the permanganate test to demonstrate monomer in the dentures of patients who had an irritated oral mucosa, and on the rapidity with which residual monomer is leached out of new dentures, the conclusion was reached that chemical irritation from acrylic appliances is unlikely. Additional supportive evidence was afforded by the observation that the majority of patients who were surveyed did not complain of pain until months or years after the insertion of dentures.

ORAL SURGERY

With reference to painful, inflammatory lesions of the mouth, the reported use of hydrocortisone acetate is of considerable interest. After treating a number of patients with denture sore mouth, glossitis and rheumatoid arthritis of the temporomandibular joint by either topical application or injection, Horton[20] reported a great reduction in inflammation and pain within a period of from one to three days. Somewhat similar beneficial results have followed the use of antihistaminic drugs, particularly in connection with wound healing. For the greater part, these reports have been based on clinical observation. In order to assess the therapeutic merits of pyrrobutamine in controlled animal studies, Baldridge[21] inflicted a standardized wound in the flank of guinea pigs and compared the rate of healing under varying schedules of preoperative and postoperative administration of the drug. On the basis of such observations, it was concluded that a preoperative blood level of antihistamine was essential for accelerated healing, and that an optimum dose could be established beyond which the effectiveness of the drug was not enhanced.

Another study of wound healing, with special reference to extraction sockets, was reported by Davis, Hubbell, Bogart and Graves.[22] Having found that little agreement prevails regarding the value of socket dressings, and that a blood clot alone is not sufficient to induce satisfactory healing in lower third molar sockets, these authors decided to evaluate the effectiveness of oxytetracycline and sulfa cones. Clinical trials were made on approximately 3,000 patients who were divided into two groups, one made up of controls and one of those treated with one or the other medication. It was noted that the experimental subjects had significantly fewer instances of complicated healing. However, one may be somewhat critical of this report since the sole criterion for postoperative complication was the subjective symptom of pain.

Although the problem of pain after dental extractions is of concern to the practitioner, the frequent loss of first permanent molars because of caries in childhood and adolescence creates a greater problem. Clark, Tam and Mitchell[23] proposed that developing third molars might be used to replace these missing teeth. They performed 19 transplants in 18 patients. It is of considerable interest to note that suppuration or inflammation of the gingivae did not result in any of these cases, and that a

positive response to pulp tests was achieved in 85 per cent of the teeth by the eighth month. Even more significant was the fact that in all instances a healthy periodontal membrane and lamina dura were established.

Fleming[24] utilized the technic of transplantation in a less practical sense and demonstrated that tooth germs from humans will survive transfer to the anterior eye chambers of guinea pigs and rats. It is hoped that this technic will provide other investigators with a useful tool for further studies on dental growth and development.

A rather obscure sequel to removal of maxillary teeth in human beings is the alteration in size of the adjacent antrum. Because of conflicting statements in the literature regarding the nature of this change, Rosen and Sarnat[25] compared the volume of the right and left sinuses of dogs in which teeth adjacent to the left antrum had been extracted. After the demonstration that there was no appreciable difference between the left and right antrums in control animals, the observation of a significant increase in size of the sinus on the extracted side was accepted as a valid finding. In a discussion of this observation, it was suggested that after extraction of teeth, the normal rate of resorption in the alveolar process increases, whereas the rate of apposition is reduced because of the absence of functional stimulation.

PATHOLOGY OF DENTAL PULP

Of particular interest in the field of oral pathology is the nature of pulpal response to injury. The histopathology of the pulp, which often accompanies the insertion of fillings and therefore is related in part to the materials employed, is of prime concern to the dental practitioner.

Quite at variance with a number of previous reports on the subject of pulp reactions to direct filling resins are the findings of Nygaard-Östby.[26] It was found, after testing five brands of acrylic resin, that the pulps of children's teeth exhibited both odontoblastic destruction and inflammation after a period of one to three months' exposure to the filling materials. A more severe change, characterized by partial pulp necrosis, was observed in the teeth of adults after periods of 10 to 14 months. No significant differences were noted in the various brands tested. The conclusion that direct filling resins do not meet the requirements of modern dentistry is perhaps somewhat dogmatic inasmuch as no reference is made to the use of cavity liners. Obviously, a similar conclusion could be made in connection with silicate cements if the bases of deep-seated cavities were unlined.

A somewhat similar study of pulp reaction to baseplate gutta-percha and cavity preparation was carried out by James, Schour and Spence.[27] The air-brasive and rotary bur technics were employed in the preparation of cavities in 38 permanent, noncarious teeth in 13 patients of varying age. After insertion of the filling material, the teeth were extracted at intervals up to 36 days and prepared for histologic study. Inflammatory pulp lesions were demonstrated that ranged from acute to chronic, regardless of the method of cavity preparation; therefore, it was concluded that gutta-percha is an unsatisfactory filling material.

Although pulp studies on human subjects can provide much needed information, some question exists regarding the adequacy of control measures and the interpretation of findings. Even when rats and hamsters are used, the difficulty of obtaining consistently uniform depths of cavity preparation is of concern to most investigators. Because Paynter and Wood[28] recognized these many difficulties, they designed an ingenious apparatus which can be used to prepare comparable cavities on the lingual surfaces of the upper first molar teeth in rats. It

is to be hoped that this or similar methods of accurate experimental procedure will be adopted by those exploring the subject of the pulp response to various stimuli.

With further reference to the subject of pulp pathology, the mechanism involved in the causation of pain when various stimuli are applied to exposed dentin is still unknown. Kramer[29] has pointed out that, although the predentin layer bordering the pulp has been shown to contain nerve fibers, there is still doubt regarding the innervation of fully formed dentin.[30] One other theory regarding the mechanism of dentin sensitivity is that peripheral stimuli are transmitted to the pulp by the movement of columns of semi-fluid material contained within the dentinal tubules. Because of the observation that odontoblasts, as well as other pulp cells, are often aspirated into tubules irritated by cavity preparation or acrylic fillings, and because of the lack of correlation between pain and this evidence of tubular disturbance, it was suggested by the authors that the so-called hydrodynamic theory of pain transmission is invalid.[33]

CONGENITAL MALFORMATIONS

Another area of considerable interest in the field of oral pathology is the incidence and pathogenesis of congenital malformations. Prominent among such disabilities is cleft palate. Lutz and Moor[31] reported on 303 instances of cleft palate occurring among 72,107 children born at the Los Angeles County Hospital. They made a number of interesting observations such as the incidence of cleft palate as related to season—that its occurrence was highest in children delivered during the months of June, July and August; the occurrence of other deformities in 25 per cent of the children; a 65 per cent incidence of bilateral clefts; a lack of correlation between the occurrence of clefts and parental age; and a 3 per cent incidence of cases where the abnormality occurred more than once in the same family.

Further evaluating this question, Scott[32] suggested that clefts of the palate and lip may, under certain circumstances, be related to cysts developing along the lines of union of the embryological processes forming the roof of the mouth. This study was based on serial sections of 11 specimens of fetal material in which the early development of oral cysts was found. In another interesting report of oral cysts, particularly related to the gingival area, it was found by Bhaskar and Laskin[33] that the origin is from traumatically displaced epithelium.

The study of Warkany and Deuschle[34] calls attention to other etiologic factors in congenital abnormalities of the dentofacial complex. Of particular interest in this investigation was the high incidence of cleft palates and failure of development of lower incisors in the offspring of rats rendered deficient in riboflavin. The authors emphasize, however, that some of the elements of the pattern of this deficiency have been described in the young of animals subjected to other vitamin deprivations, as well as to roentgen ray exposure and cortisone injections.

Although not directly related to the subject of congenital abnormalities, the question of origin of staining in instances of developmental enamel defects attributed to endemic fluorosis is of considerable interest. In an effort to ascertain whether the stain is caused by such deposits as manganese or iron, Ockerse and Wasserstein[35] spectrographically tested a number of normal and mottled teeth. Their findings indicated that the manganese content increases in proportion to the severity of mottling, whereas the amount of iron remains rather constant in all teeth. Unfortunately, the source of manganese could not be established, nor was it determined whether stains in foodstuffs and saliva are also causal factors.

ONCOLOGY

Unquestionably, one of the most significant developments in the field of oral pathology is the increasing awareness by the dental practitioner of his responsibility in the early detection of oral cancer. Studying 401 cases of intraoral squamous cell carcinoma, Tiecke and Bernier[36] made a number of interesting observations. Principal among these was the 50 per cent incidence of cancer of the tongue which occurred in a younger age group. These patients had regional node involvement or metastasis more frequently and a lower three-year survival rate than did the patients with lesions in other sites. Such general observations are discussed as the relation of syphilis and tobacco to oral cancer, and the comparable survival rates of patients treated with surgery and radiation, and it concludes by emphasizing the vital importance of early diagnosis.

1. Keller, G. J., and Cohen, D. W. India ink perfusions of the vascular plexus of oral tissues. Oral Surg., Oral Med. & Oral Path. 8:539 May 1955.

2. Waerhaug, J. The gingival pocket. Odont. Tskr. 60: Supp. I, 1952.

3. Butcher, E. O. The attachment and reattachment of the enamel epithelium in the incisors of monkeys. J. D. Res. 32:641 Oct. 1953.

4. Butcher, E. O. The cuticles, epithelial attachment and reattachment in the incisors of the Rhesus monkey. Brit. D. J. 94:197 April 1953.

5. Arnim, S. S. The defense mechanism of the gingiva. J. Periodont. 26:79 April 1955.

6. Butcher, E. O., and Vidair, R. V. Periodontal fiber reattachment in replanted incisors of the monkey. J. D. Res. 34:569 Aug. 1955.

7. Linghorne, W. J., and O'Connell, D. C. Studies in the reattachment and regeneration of the supporting structures of the teeth. J. D. Res. 34:164 April 1955.

8. Glickman, I., and Weiss, L. A. Role of trauma from occlusion in initiation of periodontal pocket formation in experimental animals. J. Periodont. 26:14 Jan. 1955.

9. Waerhaug, J. Pathogenesis of pocket formation in traumatic occlusion. J. Periodont. 26:107 April 1955.

10. Shroff, F. R. An observation of the attachment of calculus. Oral Surg., Oral Med. & Oral Path. 8:154 Feb. 1955.

11. Waerhaug, J. The source of mineral salts in subgingival calculus. J. D. Res. 34:563 Aug. 1955.

12. Bavetta, L. A., and Bernick, S. Lysine deficiency and dental structures. J.A.D.A. 50:427 April 1955.

13. Stahl, S. S.; Sandler, H. C., and Cahn, L. The effects of protein deprivation upon the oral tissues of the rat and particularly upon periodontal structures under irritation. Oral Surg., Oral Med. & Oral Path. 8:760 July 1955.

14. Schultz-Haudt, S.; Bibby, B. G., and Bruce, M. A. Tissue-destructive products of gingival bacteria from nonspecific gingivitis. J. D. Res. 33:624 Oct. 1954.

15. Hunter, H. A. A study of tissues treated with antiformin citric acid. J. Canad. D. A. 21:344 June 1955.

16. Glickman, I. Histologic study of the effects of antiformin on the soft tissue wall of periodontal pockets in human beings. J.A.D.A. 51:420 Oct. 1955.

17. Afonsky, D. Oral lesions in niacin, riboflavin, pyridoxine, folic acid and pantothenic acid deficiencies in adult dogs. Oral Surg., Oral Med. & Oral Path. 8:867 Aug. 1955.

18. Squires, B. T. Pattern of the human tongue. The Lancet 1:647 March 1955.

19. Smith, D. C., and Bains, M. E. D. Residual methyl methacrylate in the denture base and its relation to denture sore mouth. Brit. D. J. 98:55 Jan. 1955.

20. Horton, C. P. Hydrocortisone acetate in the treatment of oral inflammatory disease. New York J. Den. 25:10 Jan. 1955.

21. Baldridge, O. L. Effects of antihistamine pyrrobutamine on soft tissue wound healing. J. Oral Surg. 13:183 July 1955.

22. Davis, W. H., and others. Extraction wound healing: clinical observations. J. Oral Surg. 13:244 July 1955.

23. Clark, H. B., Jr.; Tam, J. C., and Mitchell, D. F. Transplantation of developing teeth. J. D. Res. 34:322 June 1955.

24. Fleming, H. S. Transplantation of human tooth germs to lower animals. J. D. Res. 34:329 June 1955.

25. Rosen, M. D., and Sarnat, B. G. Change of volume of the maxillary sinus of the dog after extraction of adjacent teeth. Oral Surg., Oral Med. & Oral Path. 8:420 April 1955.

26. Nygaard-Ostby, B. Pulp reactions to direct filling resins. J.A.D.A. 50:7 Jan. 1955.

27. James, V. E.; Schour, I., and Spence, J. M. Response of human pulp to gutta-percha and cavity preparation. J.A.D.A. 49:639 Dec. 1954.

28. Paynter, K. J., and Wood, A. W. S. A method for testing pulpal response to stimuli using the rat molar. J. Canad. D. A. 21:145 March 1955.

29. Kramer, I. R. H. The relationship between dentin sensitivity and movements in the contents of the dentinal tubules. Brit. D. J. 98:391 June 1955.

30. Phillip, J. J. Extent of distribution of nerve fibers in the human tooth. J.A.D.A. 50:22 Jan. 1955.

31. Lutz, J. R., and Moor, F. B. A study of factors in the occurrence of cleft palate. J. Speech & Hearing Disorders 20:271 Sept. 1955.

32. Scott, J. H. The early development of oral cysts in man. Brit. D. J. 98:109 Feb. 1955.

33. Bhaskar, S. N., and Laskin, D. M. Gingival cysts. Report of three cases. Oral Surg., Oral Med. & Oral Path. 8:803 Aug. 1955.

34. Warkany, J., and Deuschle, F. M. Congenital malformations induced in rats by maternal riboflavin deficiency: dentofacial changes. J.A.D.A. 51:139 Aug. 1955.

35. Ockerse, T., and Wasserstein, B. Stain in mottled enamel. J.A.D.A. 50:536 May 1955.

36. Tiecke, R. W., and Bernier, J. L. Statistical and morphological analysis of four hundred and one cases of intraoral squamous cell carcinoma. J.A.D.A. 49:684 Dec. 1954.

ORTHODONTIC RESEARCH

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Published research is an expression of observations and opinions of the authors based on investigations conducted before, and in some instances many years before, reports are made public. Therefore, the articles of annual volumes tend to blend one year with another. Only occasionally is a new and scientifically significant report identified immediately. In 1955 it is seen that the cephalometer is being used to a greater extent in the analysis of clinical problems and results and there is a continuation of interest in function and a renewed interest in histological research. In Europe, publications tend to be clinical and philosophical with research dominated by analysis of data carefully collected some years ago, as exemplified by the reports of Björk.

Published in periodicals of North America, the following reports of research are of interest.

Orthodontic movement of vital and nonvital teeth was studied by Huettner and Young.[1] Using mechanical forces on the teeth of the *Macacus rhesus* monkey, they found no essential difference in the reaction of supporting tissues and no evidence of foreign body reaction.

Root resorption of teeth of orthodontic patients was studied by Phillips[2] and found to be clinically insignificant in degree. Injured teeth were more susceptible and metabolic factors probably were significant.

Limitation of the application of the mandibular rest position theory was suggested by Ricketts,[3] who expressed the belief that the key to knowledge of facial growth and physiologic change during treatment lies within the temporomandibular complex.

The norm theory in dental orthopedics was presented by Koski.[4] He differentiated between clinical and statistical diagnostic norms.

Pathological changes in the gingiva during orthodontic treatment was studied by Pence,[5] who reported an increase in the incidence and severity of gingivitis during treatment, with resulting decrease in retention.

Gorelick[6] expressed the belief that pacifiers may be employed to prevent thumbsucking.

Changes in cranial base in Swedish boys from age 12 to 20 were reported by Björk.[7] The investigation was concerned with a quantitative estimate of the magnitude of individual growth changes within the cranial base and the extent and manner of coordination of brain case and facial development.

A device, the craniophorometer, for taking roentgenograms of the temporomandibular joint was described by Perkins.[8]

Overbite in young adults was evaluated cephalometrically by Popovich,[9] who found that in instances of Class I deep overbite the effective length of the upper incisors was directly related to the overbite, and probably the incisal angle, the degree of elevation of the upper first molar, and effective length of the lower incisors are significant in his classification.

An incomplete review of the foreign literature includes the following reports:

The His' line is suggested by Koski[10] as a horizontal growth axis of the face. This line is delineated by acanthion anteriorly and opisthion posteriorly.

Significant correlation between the tooth width ratio and the difference in crowding between the maxilla and the mandible is reported by Lundstrom.[11] He believes that in most instances variation in tooth width plays a minor role.

Self-correcting occlusal anomalies and their application to early orthodontic

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treatment are discussed by Korkhaus.[12] Although his paper cannot be considered a research report in a strict sense, Korkhaus applies his own and the research observations of others to clinical problems. He points out the importance played by the changes in the incisor and buccal arch segments in the transition through the mixed to the permanent dentition. He also points out that natural forces can be used by the orthodontist in a planned and methodical way.

Three contributions of Björk deserve mention: the description of a method for studying jaw growth which uses metallic implants and cephalometry;[13] a study of the various factors concerned with overjet, their quantitative effect and interaction;[14] and the relation of bite development and body build.[15]

1. Huettner, R., and Young, R. Movability of vital and devitalized teeth in the Macacus rhesus monkey. Oral Surg., Oral Med., & Oral Path. 8:189 Feb. 1955.

2. Phillips, J. R. Apical root resorption under orthodontic therapy. Angle Orthodont. 25:1 Jan. 1955.

3. Ricketts, R. M. Facial and denture changes during orthodontic treatment as analysed from the temporomandibular joint. Am. J. Orthodont. 41:163 March 1955.

4. Koski, K. Norm concept in dental orthopedics. Angle Orthodont. 25:113 April 1955.

5. Pence, W. Clinical and histologic study of the pathology of the gingivae during orthodontic therapy. Northwest. Univ. D. School Bull. (Research and Graduate Studies) 55:12 Feb. 21, 1953.

6. Gorelick, L. On the use of pacifiers in preventing malocclusion. New York D.J. 21:3 Jan. 1955.

7. Björk, A. Cranial base development. Am. J. Orthodont. 41:198 March 1955.

8. Perkins, G. Craniophorometer. J.A.D.A. 50:441 April 1955.

9. Popovich, F. Cephalometric evaluation of vertical overbite in young adults. J. Canad. D.A. 21:209 April 1955.

10. Koski, K., and Virolainen, Kaija. Relation of his'-line to the nasal floor. A roentgenologic cephalometric study. D. Record 75:45 Feb.-March 1955.

11. Lundstrom, A. Intermaxillary tooth width ratio and tooth alignment and occlusion. Acta odont. Scandinav. 12:266 Feb. 1955.

12. Korkhaus, G. Forces involved in self-correcting occlusal anomalies and their application to the early orthodontic treatment. Internat. D.J. 5:3 March 1955.

13. Björk, A. Facial growth in man, studied with the aid of metallic implants. Acta odont. Scandinav. 13:9 June 1955.

14. Björk, A., and Palling, Mogens. Adolescent age changes in sagittal jaw relation, alveolar prognathy, and incisal inclination: Acta odont. Scandinav. 12:201 Feb. 1955.

15. Björk, A. Bite development and body build. D. Record 75:8 Jan. 1955.

BIOCHEMISTRY

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Summarizing the interesting and important papers published in biochemistry during the past year would be a lengthy and highly technical job of doubtful interest in many aspects to most dental readers. An attempt has been made, therefore, to select high lights of extraordinary accomplishments.

NATURE OF THE VIRUS

The tobacco mosaic virus has been torn into inactive fragments; that is, two principal constituents, nucleic acid and protein. These were recombined into the active, infective virus by H. L. Fraenkel Conrat and Robley Williams[1] of the Virus Laboratory of the University of California. Two processes were employed to obtain the fragments; (1) the virus was treated with sodium lauryl sulfate which tore the protein off of the thin thread of nucleic acid that constitutes the central fiber of the virus rod, and (2) from other samples the protein was

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obtained free from nucleic acid by treatment with sodium carbonate. Treatment of the protein alone with acid caused little doughnut-shaped objects to be formed as seen in an electron micrograph; these were inactive. Treatment of the protein with acid in the presence of the nucleic acid formed a virus rod; this was active (infective). The protein apparently wrapped itself around a nucleic acid thread like the lead in a lead pencil to make the virus rod. This rod had the properties of living tobacco mosaic virus.

The first crystallization of a virus that is infective for man or animals was also achieved in the Virus Laboratory of the University of California by C. E. Schwerdt and F. L. Schaffer.[2] The polio virus was obtained from a monkey kidney (specifically the MEF—I, Type II polio). The kidney protein contained about 1 part in 10,000 of active virus by weight. By suitable solution and digestive procedures, the contaminating proteins were reduced to such an extent that on storage in the cold some of the polio virus crystallized. It was found that the crystalline virus was fully infective for monkeys.

STRUCTURE OF VITAMIN B_{12}

The structure of the vitamin B_{12} molecule, the cobalt-containing vitamin, was announced by Sir Alexander Todd and his colleagues of the Cambridge Laboratory (England). Chemical work in the past few years had led to the identification of many of the important parts of the structure. The roentgen ray crystallographic findings of Dorothy Hodgkin[3] and her group at Oxford were sent to the University of California at Los Angeles where Kenneth N. Trueblood and colleagues using the UNIVAC computer developed a three dimensional electron density projection "which revealed almost every structural feature of the molecule and provided the key to the B_{12} identification." The B_{12} vitamin is the "heaviest and most complicated non-protein material in nature." The proof of the exact structure of this extremely complicated vitamin is a milestone.

SYNTHESIS OF ALDOSTERONE

The principal life-maintaining hormone of the adrenal cortex, aldosterone, was synthesized in a brilliant chemical attack announced by Alfred Wettstein,[4] from the laboratories of Ciba, University of Basle, Swiss Federal Institute of Technology, and N. V. Organon (Netherlands). Starting with a relatively simple tricyclic compound, the one used by Sarett and co-workers in synthesizing the natural isomer of cortisone, Wettstein and colleagues carried through 30 synthetic steps to the final crystalline aldosterone. The crystalline material had in microgram quantities the biological properties of sodium retention and potassium excretion exhibited by the natural aldosterone. In the past, huge amounts of beef and pig adrenals have been worked up to obtain the hormone; about 100 mg. per ton of adrenal is the usual yield. Clinical evaluation of the synthetic material will be made to decide whether commercial production will be undertaken.

STRUCTURE OF PROTEIN

Several years ago Li and his colleagues at the University of California obtained protein from the anterior lobe of a pituitary gland that had all of the properties of adrenal cortex stimulation associated with ACTH. In the meantime, it was found by the same workers that purification of the protein by ion exchange methods led to the isolation of a polypeptide having a molecular weight of about 6,500, known as corticotropin A. During the past year, Li and colleagues[5] have announced the amino acid sequence of corticotropin A. By pepsin or trypsin hydrolysis, mixtures of short chained poly-

peptides were obtained. These polypeptides were separated by chromatography, each spot was eluted and further hydrolysed. Each hydrolysis mixture was then separated by chromatography and the final individual amino acids or, in some cases, the dipeptides, were identified by chromatographic procedures. Chymotrypsin and acid hydrolysis were also used. By analyzing fractions that must have been adjacent, Li and colleagues were able to line up 19 polypeptides and show that the amino acid sequence could be resolved into a list of 39 amino acid residues in the order in which they occur along the chain of alpha corticotropin.

Another major step in the identification of the precise chemical nature of insulin was made by Sanger and colleagues[6] using somewhat similar technics. Insulin fractions A and B were subjected to hydrolysis by a protease from mold (also by a papain); the fragments were separated by iontophoresis and identified by suitable chromatographic analyses. The fractions bearing amide groups differed in their mobilities under iontophoresis. Each fraction was analyzed for the amide content. Fraction A with four amide groups has been shown to be made up of 21 amino acids in sequence. Fraction B with two amide groups has 30 amino acids in sequence.

SYNTHESIS OF A RIBOSE NUCLEIC ACID

Grunberg-Manago, Ortiz, and Ochoa[7] reported the enzymatic synthesis of a material apparently identical with the biologically occurring ribonucleic acid. The key to this synthesis came earlier when an enzyme, polynucleotide phosphorylase, was obtained from a microorganism, *Azotobacter vinelandii*. This enzyme catalyzes the synthesis of polynucleotides from nucleotide diphosphates releasing orthophosphate. The mixture of adenine diphosphate, guanine diphosphate, uridine diphosphate and cytidine diphosphate was subjected to the action of the polynucleotide phosphorylase, and a polymer of high molecular weight was obtained which "appears to be indistinguishable from native RNA."

1. Fraenkel-Conrat, H. L., and Williams, R. (Reactivation of tobacco mosaic virus). Chem. Eng. News 33:4794 Nov. 7, 1955.

2. Schwerdt, C. E., and Schaffer, F. L. (Crystallization of polio virus). Chem. Eng. News 33:4795 Nov. 7, 1955.

3. Hodgkin, D. C., and others. Structure of vitamin B_{12}. Nature 176:325, 1955; see also p. 328. See also Chem. Eng. News 33:3487, 1955 "quoted."

4. Wettstein, A. (Synthesis of aldosterone). Chem. Eng. News 33:3486, 1955.

5. Li, C. H., and others. Amino acid sequence of alphacorticotropin. Nature 176:687, 1955.

6. Sanger, F.; Thompson, E. O. P., and Kitai, R. The amide groups of insulin. Biochem. J. 59:509, 1955.

7. Grunberg-Manago, M.; Ortiz, P. J., and Ochoa, S. Enzymatic synthesis of nucleic acid-like polynucleotides. Science 122:907, 1955.

Scientific Progress • In science, no advance is final. Every problem solved produces new questions to answer, since every higher step gives us a wider outlook, and the power of seeing problems which from a lower level were not apparent. *Ernest Starling.*

RECENT STUDIES ON MEDICAL ASPECTS OF FLUORIDATION

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Intake of fluoride in food and water undoubtedly has occurred throughout the whole of the evolutionary development of man. Evidence for this conclusion has already been presented by the surveys in this country showing the presence, in numerous localities, of fluoride in water in amounts exceeding 1 ppm. An important new contribution which indicates, along with the earlier studies, that appreciable intake of fluoride from foods and water also occurs in other countries is that of Nömmik,[1] who reports several natural Swedish waters with fluoride contents well above 1 ppm. These considerations indicate that fluoridation of water would not cause to be introduced into the body a substance for which the body lacks metabolic experience. These considerations also point out the likelihood that should fluoride intake from water, of the order of 1.0 ppm, produce any deleterious effect on longevity, physical fitness, or susceptibility to disease, such effects would have been recognized. It is of incidental interest that preliminary surveys[1,2] in Sweden have shown the usual inverse relationship between the fluoride content of drinking water and the incidence of dental caries in the child population using the waters.

Further evidence of the high efficiency of the mechanisms for control of the concentrations of fluoride in the blood and body fluids has recently been provided by studies with the radioisotope of fluoride (F^{18}).[3] After the oral dose of about 90 mg. of fluoride labeled with F^{18}, hardly more than 1 per cent of the fluoride was present at one time in the entire blood volume of lambs. Similar very low concentrations of fluoride (as radiofluoride) were found in the blood of the cow following the oral ingestion of large amounts of the ion. These observations point out that the mechanisms of intestinal absorption, sequestration in bone and excretion of fluoride serve to prevent toxic concentrations of fluoride being reached in the body fluids from the ingestion of properly fluoridated water. Of special significance in this regard were the results of the same workers who showed that intravenously ingested fluoride disappeared from the blood at the rate of 32 to 41 per cent per minute. The earlier work of Wallace-Durbin[4] who also worked with F^{18} likewise showed an extremely rapid disappearance of fluoride from the blood. Her work also pointed out the importance of the skeleton in sequestration of fluoride from the body fluids, but it should be emphasized that the skeletal accumulation of fluoride of the order of 50 to 60 per cent of a single oral dose in rats cannot be translated to indicate a permanent skeletal storage of fluoride of this magnitude in the human being through the use of fluoridated water.

The intragastric administration of 5 mg. fluoride as sodium fluoride or stannous fluoride in anesthetized dogs[5] produced a slight but definite lowering of blood pressure with concomitant decreases of pulse pressure and elevations of heart rate. Since no such effects were produced by similar administrations of 1 mg. fluoride, it was concluded that the use of communal water containing 1 ppm fluoride would cause no hypotensive response. Auskaps and Shaw[6] found that up to 20 ppm of fluoride in the drinking water of rats for periods of at least 140 days did not affect body growth, thyroid weights or structure or circulating hemoglobin levels. Also, the resistance of the fluoride-treated animals to epidemic respiratory disease was not altered. The

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physiologic function of the thyroid gland of rats as tested by radioiodide uptake and release by the gland was not affected by the administration of fluoride.[7]

Studies of fluoride excretion in abnormal states of kidney function have been recently reported. Smith, Gardner and Hodge[8] found that uranium nephritis in rabbits, which affects predominantly the renal tubules, did not increase the amount of fluoride stored by the animals. It was shown that renal tubular absorption of fluoride is less than that of chloride. These studies have given evidence that fluoride is excreted in the urine by glomerular filtration without any contribution by tubular secretion. The fluoride content of the urine of seven nephritic patients increased in a normal fashion after they used fluoridated water. Since the urine volume is frequently increased in chronic glomerulonephritis, the data of these workers for urine fluoride concentration, given in terms of ppm, suggest to this writer the possibility that some persons with nephritis may excrete more fluoride in the urine than normal persons.

The Largents[9] have also reported preliminary results of a study of fluoride excretion in chronic renal disease with the observation of delayed urinary fluoride response to a sudden increment of ingested fluoride. Even when the daily intake of fluoride was 6 mg., however, the maximum skeletal storage of fluoride was not sufficient, in the two cases of chronic renal disease studied, to have led to adverse skeletal effects in 10 to 15 years. An examination[10] was made for specific gravity, albumin, red blood cells and casts in the urine of 200 boys, aged 12 years, equally divided between residents of Newburgh and Kingston, N. Y., about eight years after initiation of fluoridation in Newburgh. Although, from the statistical standpoint, the results tended to be favorable to the Newburgh children, it was concluded only that the long-term use of fluoridated water gave no evidence of kidney irritation.

Exner[11] has given an extended statement of the grounds for his opinion that the health safety of fluoridation is unproved. He considers that the intake of fluoride ought to be individualized, he attacks the methods and observations of several investigators who have endorsed fluoridation, and he states his impression as a roentgenologist that skeletal abnormalities due to fluoride are common in the United States. On the latter point two recent reports[12, 13] of extensive roentgenological studies of the skelton have reinforced the prior published evidence that the prolonged use of water containing fluoride, even when of higher fluoride content than that required for optimal dental benefits, is without significant or frequent effects on the structure of the bones and produces no alteration of skeletal function.

1. Nömmik, Hans. Fluorine in Swedish agricultural products, soil and drinking water. Acta Polytech. no. 127, 1953.

2. Eriksson, S. E. Om salivundersökningar och serumanalyser pa barn i ett fluordistrikt. Svensk tandläk. tskr. 48:303, 1955.

3. Perkinson, J. D., Jr., and others. Metabolism of fluorine[18] in domestic animals. Am. J. Physiol. 182:383, 1955.

4. Wallace-Durbin, P. Metabolism of fluorine in the rat using F^{18} as a tracer. J. D. Res. 33:789 Dec. 1954.

5. Richardson, A. W.; Muhler, J. C., and Bishop, J. G. Vasodepressor response of fluorine administered orally to dogs. J. Pharm. & Exper. Therap. 113:200 Jan. 1955.

6. Auskaps, A. A., and Shaw, J. N. Hemoglobin concentration, thyroid weight, and growth rate in rats during minimum fluoride ingestion. J. Nutrition 55:611 April 1955.

7. Harris, N. O., and Hayes, R. L. Tracer study of the effect of acute and chronic exposure to sodium fluoride on the thyroid iodine metabolism of rats. J. D. Res. 34:470 Aug. 1955.

8. Smith, F. A.; Gardner, D. E., and Hodge, A. C. Investigations on the metabolism of fluoride. III. Effect of acute renal tubular injury on urinary excretion of fluoride by the rabbit. A.M.A. Arch. Indust. Health. 11:1 Jan. 1955.

9. Largent, E. S., and Largent, K. W. Hygienic aspects of fluorine and its compounds. Am. J. Pub. Health 45:197 Feb. 1955.

10. Schlesinger, E. R.; Overton, D. E., and Chase, H. C. Study of children drinking fluoridated and nonfluoridated water. Quantitative urinary excretion of albumin and formed elements. J.A.M.A. 160:21 Jan. 7, 1956.

11. Exner, F. B. Fluoridation. Northwest Med. 54:721 July 1955.

12. Leone, N. C., and others. Roentgenologic study of a human population exposed to high-fluoride domestic water: a ten-year study. Am. J. Roentgenol. 74:874 Nov. 1955.

13. Stevenson, C. A., and Watson, R. Bone changes from fluorides in water. Presented at 56th meeting of American Roentgen Society, Chicago. Reviewed in "Spectrum." J.A.M.A. 160:adv. page 24 Feb. 4, 1956.

CARIES RESEARCH IN LABORATORY ANIMALS

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Early in 1955 there appeared a monograph[1] which covered the following: caries production in laboratory animals,[2] types of experimental animal caries,[3] various genetic,[4] developmental,[5] dietary,[6] salivary,[7] endocrine,[8] oral environmental,[9] bacterial[10] and inhibitory agents [11,12] involved in the disease, and a brief general summary.[13]

Subsequent publications during 1955 have re-emphasized strain variations in caries susceptibility of rats[14,15] and hamsters.[16,17] The extensive smooth surface lesions produced in rats by heat processed cereal foods[18] have been inhibited by L-lysine.[19] Hamster caries has been reduced considerably by supplement of 25 per cent fat,[20] and accelerated by increasing the sucrose level,[21] whereas unrefined carbohydrates did not materially modify the caries incidence.[22] A 1:2 mixture of sucrose and corn grit produced extensive caries in the rat,[23] and a component of powdered milk, probably lactose, was thought to explain the caries conduciveness of certain powdered diets fed to desalivated hamsters.[24]

Elevation of the phosphorus level caused reduction in rat caries,[25] and the ash fraction of whole food, fed from birth on, materially reduced caries in hamsters.[26] The effectiveness of stannous fluoride in experimental caries reduction[27] points to the probable significance of metallic elements. It appears that the pH, valency and position in the electromotive series may be critical factors in the caries-inhibiting action of cations.[27,28,29]

Experimental alloxan diabetes failed to bring about any increases in rat caries.[30] Estrogens were found to have a significantly greater caries increasing effect than androgens in a group of rats which were not gonadectomized.[31] A measurable increase in caries was reported in rats deprived of the pituitary gland and was accompanied by an increase in proteolytic and amylolytic activity of salivary gland extracts.[32] This and other states of hormonal imbalance were accompanied by noticeable differences in the microstructure of the submaxillary glands.[32,33] Conversely, one report described changes in endocrine organs, adrenal glands, testes and ovaries, as a consequence of surgical removal of salivary glands.[34] Selective surgical desalivation showed that the serous salivary glands are most protective against caries.[35]

Inoculation with an enterococcus was found to produce carious lesions in otherwise germfree rats.[36] In a caries-susceptible strain of rats over 21 days of age, lactobacilli and *Streptococcus salivarius* were dominating, whereas streptococci occurred most frequently in a resistant strain of rats.[37] From the oral cavity of another strain of caries-susceptible rats was recovered a variant of *Lactobacillus fermenti* which formed a golden yellow pigment.[38] Among the antibiotics penicillin proved most effective in caries inhibition, closely followed by erythromycin, whereas carbomycin and neomycin showed little or no effect.[39]

In caries-susceptible hamsters the salivary reaction was found to be consistently on the alkaline side (pH readings of 8.8 to 9.2 compared to 6.6 to 7.0 for human saliva).[40] In the albino rat, direct *in vivo* pH determinations on carious teeth gave very few pH readings below the neutral point.[41] Acid inhibition *in vitro* did not give a reliable clue to caries inhibition *in vivo*.[42] Significant increase in rat caries has been induced by dietary

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supplement of a chelating agent, ethylenediaminetetra-acetic acid which can withdraw calcium in an alkaline environment.[43]

These recent developments of laboratory bio-assays for caries research are encouraging in view of the time and expense of clinical tests.

1. Sognnaes, R. F., editor. Advances in experimental caries research. Washington, D. C., American Association for the Advancement of Science, 1955.

2. Johansen, E., and Keyes, P. H. Production and evaluation of experimental animal caries: a review. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 1-46.

3. Stephan, R. M., and Harris, M. R. Location of experimental caries on different tooth surfaces in the Norway rat. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, p. 47-65.

4. Hunt, H. R.; Hoppert, C. A., and Rosen, S. Genetic factors in experimental rat caries. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 66-81.

5. Shaw, J. H., and Sognnaes, R. F. Developmental factors in experimental animal caries. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 82-106.

6. McClure, F. J. Dietary factors in experimental animal caries. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 107-124.

7. Schwartz, A., and Weisberger, D. Salivary factors in experimental animal caries. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 125-136.

8. Shafer, W. G., and Muhler, J. C. Endocrine factors in experimental animal caries. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 137-151.

9. Finn, S. B.; Klapper, C. E., and Volker, J. F. Intra-oral effects upon experimental hamster caries. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 152-168.

10. Orland, F. J. Oral environmental factors in experimental rat caries. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 169-186.

11. Fitzgerald, R. J. Influence of antibiotics on experimental rat caries. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 187-196.

12. Hein, J. W. Effect of various agents on experimental caries. a resume. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 197-222.

13. Sognnaes, R. F. General summary. In Advances in experimental caries research, Sognnaes, R. F., editor. Washington, D. C., American Association for the Advancement of Science, 1955, p. 223-226.

14. McClure, F. J., and Losee, F. L. Dental caries and rate of growth in three strains of white rats. (Abst.) J. D. Res. 34:712 Oct. 1955.

15. Shaw, J. H. Comparative studies on the caries-susceptibility of ten strains of the common laboratory rat. (Abst.) J. D. Res. 34:727 Oct. 1955.

16. Hodge, H. C.; Johansen, E., and Hein, J. W. Third report on the breeding of caries-immune and caries-susceptible strains of Syrian hamsters. (Abst.) J. D. Res. 34:757 Oct. 1955.

17. Mitchell, D. F., and Johnsen, M. Caries resistance in the hamster. (Abst.) J. D. Res. 34:762 Oct. 1955.

18. McClure, F. J., and Folk, J. E. Experimental variables affecting caries production in rats fed diets containing processed foods. J. D. Res. 34:358 June 1955.

19. Folk, J. E., and McClure, F. J. Inhibition of smooth surface rat caries by L-lysine. (Abst.) J. D. Res. 34:686 Oct. 1955.

20. Gustafson, G., and others. Experiments with various fats in a cariogenic diet. IV. Experimental dental caries in golden hamsters. Acta Odont. Scandinavica 13:75 Aug. 1955.

21. Johansen, E. Effect of diets containing various percentages of sucrose on initiation and progression of hamster caries. (Abst.) J. D. Res. 34:758 Oct. 1955.

22. Forster, M. G.; Jenkins, G. N., and Speirs, R. L. Refinement of carbohydrate and caries. (Abst.) J. D. Res. 34:777 Oct. 1955.

23. Muhler, J. C. Cariogenicity of various corn diets in the rat. J. D. Res. 34:364 June 1955.

24. Klapper, C. E., and Volker, J. F. Effect of powdered whole milk-sorbitol diets on dental caries in desalivated hamsters. (Abst.) J. D. Res. 34:703 Oct. 1955.

25. Wynn, W., and others. Cariogenicity of a high sugar ration as affected by variations in the calcium-phosphorus ratio. (Abst.) J. D. Res. 34:736 Oct. 1955.

26. Nizel, A. E., and Harris, R. S. Effects of ashed foodstuffs on dental decay in hamsters. J. D. Res. 34:513 Aug. 1955.

27. Muhler, J. C., and Day, H. G. Effect of pH and state of oxidation of different fluorides in the drinking water on dental caries and fluorine storage in the rat. J. D. Res. 34:68 Feb. 1955.

28. Hein, J. W. Effect of a 10 ppm vanadium drinking solution on dental caries in male and female Syrian hamsters. (Abst.) J. D. Res. 34:756 Oct. 1955.

29. Wisotzky, J., and Hein, J. W. Effect of cations above hydrogen in the electromotive series on experimental caries in the Syrian hamster. (Abst.) J. D. Res. 34:735 Oct. 1955.

30. Nichols, M. S., and Shaw, J. H. Effect of alloxan diabetes on caries incidence in the albino rat. (Abst.) J. D. Res. 34:716 Oct. 1955.

31. Muhler, J. C., and Shafer, W. G. Experimental dental caries. VII. The effect of various androgens and estrogens on dental caries in the rat. J. D. Res. 34:661 Oct. 1955.

32. Shafer, W. G., and Muhler, J. C. Experimental dental caries IV. The effect of hypophysectomy on dental caries and the salivary glands of the rat. J. D. Res. 34:531 Aug. 1955.

33. Shafer, W. G., and Muhler, J. C. Influence of hormones on rat salivary glands. (Abst.) J. D. Res. 34:146 Oct. 1955.

34. Bixler, D.; Muhler, J. C., and Webster, R. C. Histochemistry of the adrenal cortex following desalivation. (Abst.) J. D. Res. 34:672 Oct. 1955.

35. Schwartz, A., and Shaw, J. H. Studies on the effect of selective desalivation on the dental caries incidence of albino rats. J. D. Res. 34:239 April 1955.

36. Orland, F. J., and others. Experimental caries in germfree rats inoculated with enterococci. J.A.D.A. 50:259 March 1955.

37. Rosen, S., and others. Microbiologic differences in the oral cavities of the Hunt-Hoppert caries-resistant and caries-susceptible rats. J. D. Res. 34:113 Feb. 1955.

38. Jordan, H. V., and Fitzgerald, R. J. Types of lactobacilli from the oral cavity of the white rat. (Abst.) J. D. Res. 34:699 Oct. 1955.

39. Fitzgerald, R. J., and Jordan, H. V. Effects of certain antibiotics on experimentally induced caries in rats. (Abst.) J. D. Res. 34:685 Oct. 1955.

40. Volker, J. F.; Apperson, L. D., and King, W. J. Influence of certain plaque absorbed agents on hamster caries. (Abst.) J. D. Res. 34:733 Oct. 1955.

41. Haldi, J., and others. In vivo pH determinations on carious and noncarious teeth in the albino rat. (Abst.) J. D. Res. 34:693 Oct. 1955.

42. Hein, J. W. Effect of a one millequivalent potassium permanganate solution upon experimental caries in male and female Syrian hamsters. (Abst.) J. D. Res. 34:756 Oct. 1955.

43. Harris, M. R. The effect of EDTA and food consumption on dental caries in rats (Abst.) J. D. Res. 34:694 Oct. 1955.

RESEARCH ON DENTAL MATERIALS

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Amalgam remains a fertile subject for investigation. Research conducted during the past year has shed additional light on the setting reactions and on the variables influencing clinical behavior. Uncombined mercury rapidly disappears as the alloy hardens, either by diffusion, combination or recombination in or with other phases present.[1] The initial shrinkage, subsequent expansion and final shrinkage can be explained by these actions. However, if polishing technics are employed that produce temperatures above 65°C., mercury will be released, resulting in a mercury-rich amalgam at the critical marginal areas. A study of the exact relationship between residual mercury and compressive strength again established the weakening effect of excess mercury in the restoration.[2] The residual mercury content varied with the original mercury-alloy ratio and the condensation pressure. Serious loss in strength occurred when the mercury exceeded 55 per cent. This particular study[2] made use of an improved laboratory method for measuring residual mercury worked out by Crawford and Larson.[3]

Another investigation has been carried out to evaluate the efficiency of various matrix band technics in restoring the normal tooth contour.[4] Silhouettes of the restorations which were made by seven technics disclosed that both contouring and wedging of the matrix were essential to accurate reproduction of the contours. Gross cervical overhang occurred if the matrix band was not securely wedged.

RESINS

Research in the field of dental resins, both basic and applied, continues at an accelerated rate. The sorption of water as related to temperature and degree of polymerization and molecular weight has been reported.[5] The mechanical properties of the direct filling resins (such as modulus of elasticity, yield point and hardness) make resin inferior to dental gold alloys and amalgam for restorations that are subject to stress.[6] Many claims made concerning the adhesion of resin cements and filling materials to the hard tooth tissues under oral conditions have not been substantiated.[7,8] The data indicate that although certain resins are superior on a dry tooth surface an ab-

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sorption of moisture breaks the bond. The clinical significance of these observations remains to be established. One study,[9] based on a 28 month evaluation of a resin cement, indicated it to be equal to zinc phosphate cement except under a very few specified conditions. Color stability has been improved but remains a problem with all the self-cured resins. A spectrophotometric method for measuring the color changes in popular brands, showed that none were entirely color stable.[10]

There is added evidence that use of tin-foil substitutes causes lower strength and increases warpage of the denture base resin compared to resin processed in a mold lined with tin foil.[11] The influence of packing pressure on the vertical dimension of dentures showed that minimum increase in the vertical dimension occurred when the dentures were invested in artificial stone and packed at high pressures.[12] Artificial teeth were forced into plaster by the average packing pressure. Irritation of the mucosa under acrylic resin dentures has often been attributed to the residual monomer present after processing. The small amount of residual monomer is leached out during the finishing of the denture and the first 17 hours in the mouth.[13] This observation confirms previous studies that true allergy to acrylic resins is seldom seen in the dental office. Another preliminary report[14] had indicated certain serious limitations to nylon as a denture base. Its mechanical properties are superior to current denture base resins but its dimensional change on curing and during water sorption makes nylon unsatisfactory, at least with the materials and technics available.

Several studies now in progress are devoted to a long neglected area in prosthetics, namely, deformation of the denture base under biting stress.[15,16] Strain gauges are an excellent laboratory tool to evaluate the type of denture base and anatomical design of the teeth.

CASTING AND INVESTMENT

Mumford[17] has published a comprehensive review of the current status of inlay casting technics. It is obvious that there are now several popular technics available, all of comparable accuracy. Choice should probably be made of the procedure that works best in a particular person's hands.

There is continued research[18,19] to determine the exact mechanism of hygroscopic expansion. Until this phenomenon is completely understood, it will be difficult to establish a standardized technic. Another new hygroscopic method,[20] whereby a specific amount of water is added to the top surface of the investment during setting, has been presented. Asgars, Mahler and Peyton contend that the degree of expansion can be varied by the amount of water added.

Much still remains to be learned about small castings. Considerable variation exists in the fit of individual castings; differences as much as 1.0 per cent in the size of castings made by a universally acceptable technic were reported.[21] Sullivan[22] has stressed the importance of accuracy of fit and the failures which inevitably result if reliance is placed on the cement alone.

IMPRESSION MATERIALS

The new rubber base impression materials are the subject of several preliminary reports.[23-25] Definite reliable technics have yet to be established for these materials but several factors have been emphasized in these early publications. The material must be bonded well to the tray or band and should not be removed from the mouth until two minutes after the set. Special care must be taken to avoid any pinching of the band during removal.

INSTRUMENTATION

Experimentation on methods of cutting enamel continues to center on improve-

ments in rotary methods, revaluation of the air abrasive technic and introduction and intense experimentation with ultrasonic devices. The developments of various rotary instruments are reviewed by Peyton.[26] In the abrading of enamel, the elimination or reduction of vibration is perhaps the most important single factor as vibration is the primary deterrent to dental service. The balance between this vibration factor and others such as reduced pain, rapidity of removal of enamel and simplicity of design, ease of repair, and life of the instrument will determine which of the auxiliary methods will be accepted within the next few years. The method that appears to be the most promising at the present time makes use of the water turbine handpiece developed by Nelsen and associates.[27]

According to Black,[28] the air abrasive method first introduced in 1951 has been used by over 2,000 dentists. He carefully gives its advantages and disadvantages and believes it has a place in dental practice. Time has shown, however, that it will not be widely accepted by dentists at the present level of development.

The ultrasonic method will be discussed by Lefkowitz.

1. Mitchell, J. A.; Dickson, George, and Schoonover, I. C. X-ray diffraction studies of mercury diffusion and surface stability of dental amalgam. Paper read before the 33rd annual meeting of the International Association for Dental Research, Chicago, March 18-20, 1955.

2. Swartz, M. L., and Phillips, R. W. Residual mercury content of amalgam restorations and its influence on compressive strength. Paper read before the 33rd annual meeting of the International Association for Dental Research, Chicago, March 18-20, 1955.

3. Crawford, W. H., and Larson, J. H. Residual mercury determination process. J. D. Res. 34:313 June 1955.

4. Castaldi, C., and Phillips, R. W. Study of the proximal contour of Class II amalgam restorations using various matrix band technics. Paper read before the 33rd annual meeting of the International Association for Dental Research, Chicago, March 18-20, 1955.

5. Brauer, G. M., and Sweeney, W. T. Effect of temperature and degree of polymerization on sorption of water by polymethyl methacrylate. Modern Plastics 32:138 May 1955.

6. Sweeney, W. T.; Sheehan, W. D., and Yost, E. L. Mechanical properties of direct filling resins. J.A.D.A. 49:513 Nov. 1954.

7. Rose, E. E., and others. Screening of materials for adhesion to human tooth structure. J. D. Res. 34:577 Aug. 1955.

8. Swartz, M. L., and Phillips, R. W. Method of measuring the adhesive characteristics of dental cement. J.A.D.A. 50:172 Feb. 1955.

9. Johnston, J. F.; Phillips, R. W., and Swartz, M. L. Laboratory and clinical investigation of certain resin restorative and cementing materials. II. A twenty-eight month clinical evaluation of a resin cement. J. Proc. Den. 5:705 Sept. 1955.

10. Fischer, T. E., and others. Spectrophotometric characterization of light-induced changes in direct-filling resins. Paper read before the 33rd annual meeting of the International Association for Dental Research, Chicago, March 18-20, 1955.

11. Fairhurst, C. W., and Ryge, G. Effect of tinfoil substitutes on the strength of denture base resins. J. Pros. Den. 5:508 July 1955.

12. Allcock, B. H., and Bevan, E. M. Effect of packing pressure on the vertical dimension of complete dentures. D. J. Australia 27:28 Feb. 1955.

13. Smith, D. C., and Bains, M. E. D. Residual methyl methacrylate in the denture base and its relation to denture sore mouth. Brit. D. J. 98:55 Jan. 18 1955.

14. Matthews, E., and Smith, D. C. Nylon as a denture base material. Brit. D. J. 98:231 April 5, 1955.

15. Stromberg, W. R. Method of measuring forces of denture bases against supporting tissues. J. Pros. Den. 5:268 March 1955.

16. Frechette, A. R. Masticatory forces associated with the use of various types of artificial teeth. J. Pros. Den. 5:252 March 1955.

17. Mumford, G. Direct gold inlay. D. J. Australia 27:109 June 1955.

18. Ryge, G., and Fairhurst, C. W. Hygroscopic expansion. Paper read before the 33rd annual meeting of the International Association for Dental Research, Chicago, March 18-20, 1955.

19. Lyon, H. W.; Dickson, George, and Schoonover, I. C. Mechanism of hygroscopic expansion in dental casting investments. J. D. Res. 34:44 Feb. 1955.

20. Asgars, K.; Mahler, D. B., and Peyton, F. A. Hygroscopic technique for inlay casting using controlled water additions. J. Pros. Den. 5:711 Sept. 1955.

21. Suffert, L. W., and Mahler, D. B. Reproducibility of gold castings made by present day dental casting technics. J.A.D.A. 50:1 Jan. 1955.

22. Sullivan, E. J. Cementation and esthetic problems in crown and bridge procedures. J.A.D.A. 51:34 July 1955.

23. Rosenstiel, E. Rubber base elastic impression materials (a preliminary note). Brit. D. J. 98:392, June 7, 1955.

24. Current notes no. 32. Rubber-base impression materials. Austral. J. Den. 59:188 June 1955.

25. Pearson, S. L. New elastic impression material: a preliminary report. Brit. D. J. 99:72 Aug. 2, 1955.

26. Peyton, Floyd A. Evaluation of dental handpieces for high speed operations. J.A.D.A. 50:383 April 1955.

27. Nelsen, Robert J. Clinical application of new hydraulic turbine handpiece. Presented as part of a panel discussion, "Further considerations of new methods for cutting tooth structure," before the Sections on Partial Prosthodontics, Operative Dentistry and Research, ninety-sixth annual session, American Dental Association, San Francisco, October 19, 1955.

28. Black, Robert B. Application and revaluation of air abrasive technic. J.A.D.A. 50:408 April 1955.

Prevalence and characteristics of periodontal disease in 12,800 persons under periodic dental observation

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Although it is generally realized that periodontal disease is a problem of major importance, there has been no extensive study of its prevalence in large population groups. In order to focus attention on this dental health problem, as well as to provide accurate data on the subject, an intensive statistical study of the prevalence of periodontal disease was undertaken among 12,800 employees at the home office of the Metropolitan Life Insurance Company in New York City.

Most of these employees were engaged in clerical work. The remainder consisted of those in executive and supervisory positions and a variety of skilled and unskilled workers in the building and commissary divisions. Nearly 70 per cent of the employee group were girls and women. The age range was from 16 to 69, but the age distribution was noticeably different for the two sexes. Nearly half of the women were under age 25; the median age of the women was 25.5 years. (The median is the middle item in a statistical series: half the instances are below the median value, and the other half are above it.) In contrast, less than 5 per cent of the men were under 25, and their median age was 42.2 years. For that reason, comparison of the observations in this study according to sex are valid only for specific age groups.

This group of adults receive a dental prophylactic cleansing and examination yearly in the dental clinic of the Company. The dental service rendered in the clinic includes roentgenograms either on request of the employees' own dentist, or routinely after the employee has been in the service of the Company more than a year. Employees are referred to their own dentists for necessary dental treatment.

Careful records are kept of the dental observations from clinical and roentgenographic examinations. These records show the condition of the mouth and teeth at the initial and subsequent examinations, including such details as fillings, crowns, extractions, cavities, unerupted teeth and periodontal disease. Clinical observations are supplemented by roentgenographic examination to disclose impacted and missing teeth, root canal fillings, caries, apical rarefied regions and periodontal pocket formation. Defects are shown for each tooth by number from 1 to 32. The procedure at the clinic is to read from upper right to lower left, number 1 being the upper right third molar and number 32, the lower left third molar.

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The observations were made by a dental hygienist during the course of the annual prophylactic cleansing of the teeth, but all observations were checked by a dentist. The data are based on observations during the year May 1951 to May 1952.

For the present study a special form was devised which gave the following data for each person in the study: for the teeth present in the mouth, the form indicated whether the teeth were affected by periodontal disease, either at present or in the past; for extracted teeth, the form indicated whether the teeth had been extracted for periodontal disease or for other conditions. Tabulations from these forms made it possible to ascertain, by sex and age, the gross prevalence of periodontal disease and the number and percentage of teeth affected or extracted for the condition, both in the aggregate and with respect to the susceptibility of individual teeth. The Company's program of periodic dental cleansing and examination for its employees, and the encouragement the employees are given to obtain necessary dental care would be expected to have a favorable influence on their dental health. Consequently, the frequency and extent of periodontal disease were probably less than in the general population. To that extent, the data reported in this paper understate the seriousness of the situation regarding periodontal disease.

The term periodontal disease as used in this study embraces degenerative changes which affect the supporting tissues of the teeth and which are found on clinical examination with a probe or scaler and are demonstrable in roentgenograms. Patients who had gingivitis only were not considered to have periodontal disease.

PREVALENCE

Figure 1 shows graphically the total frequency of periodontal disease by sex and age among employees of the Company, including the frequency of active disease and of a past history of the condition without existing disease. Table 1 gives the percentages for these items and certain others, including the frequency of instances of arrested periodontal disease and of extractions of teeth for the condition.

When the total frequency, both past and present, is considered, it will be seen that in each sex the condition is increasingly common with advancing age. In both sexes the proportion was less than 10 per cent up to age 30 but increased rapidly thereafter, so that the majority of all employees after age 45 were affected. Among the older men the proportion was four out of five. The prevalence of the condition was slightly lower in women than in men up to age 55 and much lower after that age.

In the great majority of patients affected, the process was active at the time of examination. Accordingly, the frequency of active disease closely parallels that for the total frequency.

A considerable number of those with active periodontal disease also had had extractions of some of the teeth because of the condition. Among men, as young as age 40 to 44, one out of ten had lost one or more teeth for the condition, in addition to having had other teeth affected. As Table 1 shows also, the proportion rose to about a fourth at ages 55 to 59 and a third after age 60. Among the women this proportion was about the same as among the men up to age 40 to 44, but the subsequent rise with age was somewhat smaller.

The great majority of those with a past history of periodontal disease but no present active disease consisted of those who had had the teeth extracted for the condition. Most of the men over 45 in the group were edentulous at the time of examination, but among women this proportion was less than among men in most age groups.

The number of persons in whom the condition was judged to be arrested was extremely small, and some of these patients had suffered loss of teeth from the condition. In addition, there were a small number of persons with active periodontal disease in whom the process was judged to be arrested in some of the teeth.

Figure 2 shows graphically by sex and age the percentage who had had one or more teeth extracted whether or not the disease was still active. The actual values appear in Table 1. The percentage of all employees with extractions for the condition increased with advancing age and was appreciable after age 35. By age 45, about one out of every five persons had lost one or more teeth because of periodontal disease. In men this percentage rose from 7.9 per cent at ages 35 to 39 to more than 40 per cent at ages 55 and over. In women the percentage with extractions for the condition rose from 8.5 per cent to more than 25 per cent between these two age groups.

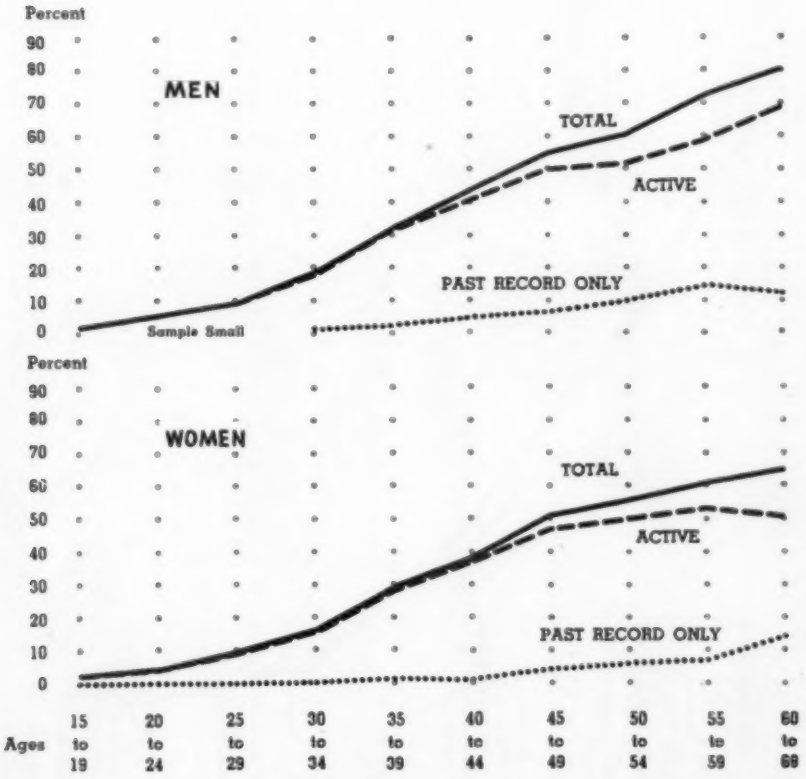

Fig. 1 • Prevalence of periodontal disease in 12,800 persons, according to sex and age. (Data for those with only past record include persons with apparently arrested process and those with extractions)

Table 1 • Percentage of employees with active or past record of periodontal disease and with extractions for it, by sex and age

Periodontal status	Per cent of total employees									
	16-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years	50-54 years	55-59 years	60-69 years
	Men									
Total per cent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No disease, past or present	98.4	94.4	91.0	81.5	67.4	55.9	45.2	39.4	27.5	19.4
With disease, past or present	1.6	5.6	9.0	18.5	32.6	44.1	54.8	60.6	72.5	80.6
Active, total	1.6	5.6	9.0	17.6	31.4	40.7	49.6	51.4	58.5	68.4
Some teeth extracted*	—	—	2.3	1.6	6.6	10.2	17.1	20.4	26.1	35.9
Some teeth with arrested process*	—	—	—	—	.2	.1	.2	.2	.8	.5
Previous record only, total	—	—	—	.9	1.2	3.4	5.2	9.1	14.1	12.1
Arrested process	—	—	—	.2	.1	.3	.7	.2	—	—
Some teeth extracted	—	—	—	—	.1	—	.3	—	—	—
Extractions only	—	—	—	.7	1.0	3.1	4.6	8.9	14.1	12.1
Edentulous†	—	—	—	.2	.3	1.4	2.6	6.7	8.1	8.7
Total with extractions	—	—	2.3	2.3	7.9	13.3	22.0	29.3	40.1	48.1
Total employees	62	125	299	433	675	907	613	416	284	206
	Women									
Total per cent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No disease, past or present	97.7	95.6	90.8	84.2	70.5	62.1	49.0	44.5	39.6	35.6
With disease, past or present	2.3	4.4	9.2	15.8	29.5	37.9	51.0	55.5	60.4	64.4
Active, total	2.2	4.2	9.0	15.2	28.1	36.7	46.9	49.7	53.3	50.6
Some teeth extracted*	—	.2	1.0	2.1	7.2	10.3	14.9	13.5	19.7	13.8
Some teeth with arrested process*	—	—	.1	—	.1	.4	.4	.2	.4	—
Previous record only, total	.1	.1	.1	.6	1.4	1.2	4.2	5.8	7.0	13.8
Arrested process	—	.1	—	.2	.1	—	.1	.2	—	—
Some teeth extracted	—	—	—	.2	—	—	—	—	—	—
Extractions only	.1	.1	.1	.4	1.3	1.2	4.0	5.6	7.0	13.8
Edentulous†	—	—	—	—	.3	.5	1.8	2.4	4.9	9.2
Total with extractions	.1	.2	1.1	2.6	8.5	11.6	19.0	19.1	26.7	27.6
Total employees	1,192	3,099	709	532	773	968	670	465	285	87

*A few persons are included in both these categories.
†All or remaining teeth extracted for periodontal disease.

NUMBER OF TEETH AFFECTED

Table 2 shows the extent of periodontal disease in two ways: (1) the percentage of all employees having a specified number of teeth affected and (2) the percentage of those employees having affected teeth, according to the number of teeth affected. Extracted teeth are included as being among those affected. The following grouping has been made for the number of teeth affected by the condition:

1. One to four teeth.
2. Five to eight teeth.
3. Nine to 32 teeth (more than a fourth of the teeth).
   a. Nine to 16 teeth.
   b. Seventeen to 32 teeth (more than a half of the teeth).

Among those with the condition who were under 35, the process generally affected only a few teeth, but after that age those with the condition usually had five or more teeth affected. The percentage of such instances steadily increased with age in both sexes. It will be

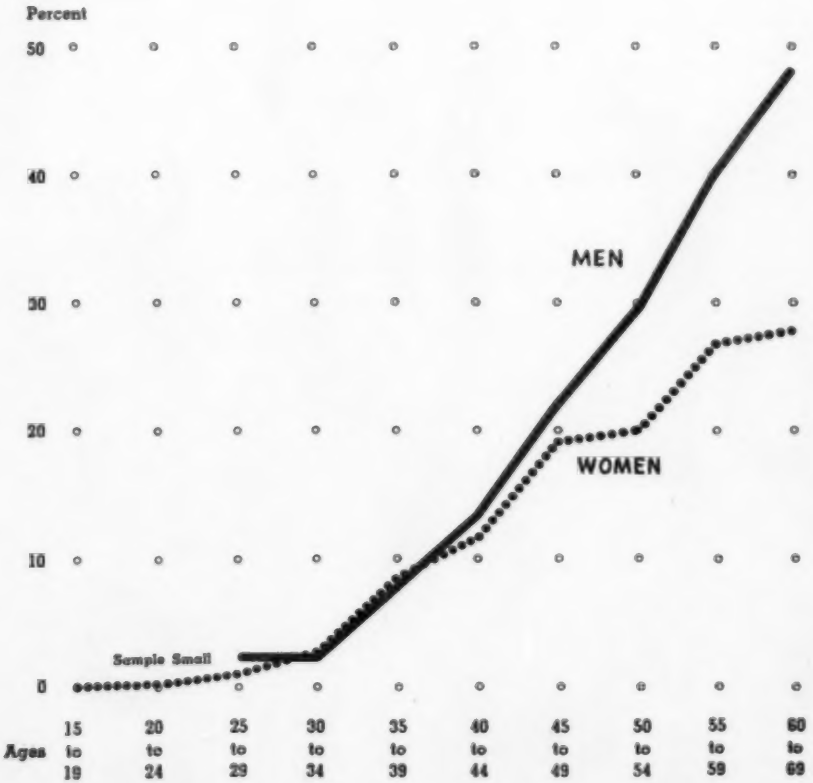

Fig. 2 • Frequency of extractions for periodontal disease in 12,800 persons, according to sex and age

seen that by ages 45 to 49 more than one out of every five men had more than a fourth of the teeth affected, and one out of nine had more than a half of the teeth affected. Among the women, approximately one out of six had a fourth of the teeth affected, and one out of 14 had more than a half of the teeth affected. On the basis of the total number of persons affected with the condition, it was found that 39.9 per cent of the men had more than a fourth of the teeth affected by ages 45 to 49, and 20.7 per cent of them had more than a half of the teeth affected. Among women the corresponding percentages were 31.7 per cent and 14.4 per cent respectively. These percentages rose still further in the older age groups for the men and, generally, for the women.

Among those with periodontal disease, the median number of teeth affected increased with the age of the person, but this increase was not regular. Thus, among men the median values were slightly more than three teeth at ages 25 to 34 and reached a peak of more than seven teeth at ages 55 and over.

Table 2 • Frequency of periodontal disease according to number of teeth affected, by sex and age

Number of teeth affected	16-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years	50-54 years	55-59 years	60-69 years
Men	Percentage of employees having indicated number of affected teeth									
Total	1.6	5.6	9.0	18.2	32.6	43.8	54.5	60.3	72.5	80.6
1-4 teeth	—	4.0	5.4	12.2	14.8	19.5	19.1	21.2	21.8	24.8
5-8 teeth	—	1.6	1.3	3.0	7.7	10.7	13.7	14.2	16.2	18.4
9-32 (more than ¼) teeth	1.6	—	2.3	3.0	10.1	13.6	21.7	25.0	34.5	37.3
9-16 teeth	1.6	—	1.3	1.2	6.1	7.5	10.4	13.0	18.3	18.4
17-32 (more than ½) teeth	—	—	1.0	1.8	4.0	6.1	11.3	12.0	16.2	18.9
Women										
Total	2.3	4.3	9.2	15.8	29.4	37.9	50.9	55.3	60.4	64.4
1-4 teeth	1.4	2.9	6.6	8.6	13.7	16.8	22.8	23.0	22.5	25.3
5-8 teeth	.4	.5	1.1	4.5	8.2	9.4	11.9	15.3	15.8	20.7
9-32 (more than ¼) teeth	.5	.9	1.4	2.7	7.5	11.7	16.1	17.0	22.1	18.3
9-16 teeth	.2	.5	.7	1.1	4.5	6.3	8.8	10.1	11.9	9.2
17-32 (more than ½) teeth	.3	.4	.7	1.6	3.0	5.4	7.3	6.9	10.2	9.1
Men	Percentage distribution of employees with affected teeth, according to number of teeth affected									
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1-4 teeth	—	71.4	59.3	67.1	45.5	44.6	35.0	35.1	30.1	30.7
5-8 teeth	—	28.6	14.8	16.5	23.6	24.4	25.1	23.5	22.3	22.9
9-32 (more than ¼) teeth	100.0	—	25.9	16.5	30.9	31.0	39.9	41.5	47.6	46.4
9-16 teeth	100.0	—	14.8	6.3	18.6	17.1	19.2	21.5	25.2	22.9
17-32 (more than ½) teeth	—	—	11.1	10.2	12.3	13.9	20.7	20.0	22.4	23.5
Median (number)	*	*	3.2	3.0	4.9	4.6	6.4	5.7	7.4	7.1
Women										
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1-4 teeth	63.0	66.9	72.3	54.8	46.7	44.4	44.9	41.6	37.2	39.3
5-8 teeth	18.5	12.8	12.3	28.6	27.8	24.8	23.5	27.6	26.2	32.1
9-32 (more than ¼) teeth	18.5	20.3	15.4	16.7	25.5	30.8	31.7	30.7	36.7	28.6
9-16 teeth	7.4	10.5	7.7	7.1	15.4	16.6	17.3	18.3	19.8	14.3
17-32 (more than ½) teeth	11.1	9.8	7.7	9.6	10.1	14.2	14.4	12.4	16.9	14.3
Median (number)	2.8	2.7	2.0	3.5	4.4	5.0	4.8	5.0	5.6	5.0

*Less than ten persons.

Among women the values were between two and three teeth in the age groups up to 30, reached five at ages 40 to 44 and varied little thereafter. It should be kept in mind, however, that among women the percentage of patients with the condition increased after age 40, even though the median number of teeth affected did not.

From age 45 on, the medians were consistently higher for men than for women. Prior to that age, there was no consistency in this regard.

NUMBER OF TEETH EXTRACTED

Table 3 shows the percentage of employees having extractions because of periodontal disease. The two parts of this table are analogous to the two parts of Table 2, in that the base for percentages in the upper part of the table is the total number of employees, whereas in the lower part it is the total number of employees having extractions.

Under age 35 very few had more than four teeth extracted for periodontal disease. The proportion of persons with

Table 3 • Frequency of extractions for periodontal disease according to number of teeth extracted, by sex and age

Number of teeth extracted	16-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40-44 years	45-49 years	50-54 years	55-59 years	60-69 years
Men	Percentage of employees having indicated number of teeth extracted									
Total	—	—	2.3	2.3	7.9	13.3	22.0	29.3	40.1	48.1
1-4 teeth	—	—	2.3	1.8	5.8	7.9	13.2	15.4	20.1	27.2
5-8 teeth	—	—	—	.2	.4	3.1	3.6	3.4	6.3	5.8
9-32 (more than ¼) teeth	—	—	—	.2	1.6	2.3	5.2	10.6	13.7	15.1
9-16 teeth	—	—	—	—	.9	1.8	2.4	5.0	7.4	8.3
17-32 (more than ½) teeth	—	—	—	.2	.7	.5	2.8	5.6	6.3	6.8
Women										
Total	.1	.2	1.1	2.6	8.5	11.6	19.0	19.1	26.7	27.6
1-4 teeth	.1	.2	.8	2.6	6.3	8.8	11.5	11.4	13.3	13.8
5-8 teeth	—	*	.3	—	1.2	2.0	3.6	3.4	6.0	4.6
9-32 (more than ¼) teeth	—	—	—	—	1.0	.8	3.8	4.3	7.4	9.1
9-16 teeth	—	—	—	—	.8	.7	2.2	2.8	3.9	2.3
17-32 (more than ½) teeth	—	—	—	—	.2	.1	1.6	1.5	3.5	6.8
Men	Percentage distribution of employees having extractions, according to number of teeth extracted									
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1-4 teeth	—	—	100.0	80.0	73.6	59.5	60.0	52.5	50.0	56.6
5-8 teeth	—	—	—	10.0	5.7	23.1	16.3	11.5	15.8	12.1
9-32 (more than ¼) teeth	—	—	—	10.0	20.7	17.4	23.7	36.1	34.2	31.3
9-16 teeth	—	—	—	—	11.3	13.2	11.1	17.2	18.4	17.2
17-32 (more than ½) teeth	—	—	—	10.0	9.4	4.2	12.6	18.9	15.8	14.1
Median (number)	—	—	†	1.7	1.3	2.7	2.6	3.3	4.0	2.9
Women										
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1-4 teeth	100.0	85.7	75.0	100.0	74.2	75.9	60.6	59.6	50.0	50.0
5-8 teeth	—	14.3	25.0	—	13.6	17.0	18.9	18.0	22.4	16.7
9-32 (more than ¼) teeth	—	—	—	—	12.1	7.1	20.5	22.4	27.6	33.3
9-16 teeth	—	—	—	—	9.1	6.2	11.8	14.6	14.5	8.3
17-32 (more than ½) teeth	—	—	—	—	3.0	.9	8.7	7.8	13.1	25.0
Median (number)	†	†	†	.9	1.5	1.8	2.5	2.5	4.0	4.0

*Less than .05 per cent.
†Less than ten persons.

Table 4 • Percentage of teeth affected by periodontal disease or extracted for it,* by sex and age of employee

Age	Total affected		Extractions	
	Men	Women	Men	Women
16-19	.8	.5	—	—
20-24	.7	.9	—	†
25-29	2.4	1.9	.1	.1
30-34	4.2	3.8	.5	.2
35-39	9.9	8.8	1.5	1.3
40-44	14.1	12.6	2.6	1.7
45-49	22.1	18.8	5.8	4.8
50-54	26.8	24.0	10.6	6.0
55-59	36.6	29.9	14.8	10.3
60-69	42.9	33.5	15.7	15.9

*Computations based on number of teeth exposed to risk of periodontal disease, that is, excluding teeth missing, unerupted or extracted for reasons other than periodontal disease.

†Less than .05 per cent.

more than four teeth extracted for the condition, as well as of those losing a considerably larger number of teeth, increased steadily with age. Thus, the percentage of persons with at least five teeth extracted rose from 2.0 per cent of all men at ages 35 to 39, to 20.9 per cent at ages 60 to 69. Among women the corresponding rise was from 2.2 per cent to 13.7 per cent. The percentage with more than a fourth of the teeth extracted first became of significant size at ages 45 to 49, when it was 5.2 per cent among men and 3.8 per cent among women. In the 55 to 59 age group, the corresponding values were 13.7 per cent for men and 7.4 per cent for women.

On the basis of those with extractions for periodontal disease, the percentage losing more than a fourth of their teeth rose in the men from 20.7 per cent at ages 35 to 39 to 34.2 per cent at ages 55 to 59; among women the corresponding values were 12.1 per cent and 27.6 per cent respectively.

Loss of more than a half of the teeth for periodontal disease was infrequent until after age 45 (Table 3). Among those persons with extractions for the condition, the median number of teeth lost rose irregularly with age (Table 3).

Up to this point the data have related to the percentage of persons affected with periodontal disease. The remaining data are based on the number of teeth exposed to risk of the condition, that is, the total, excluding teeth that were missing or unerupted at the time of the examination or previously extracted for reasons other than periodontal disease. The number of teeth exposed to the risk of periodontal disease was estimated on the basis of the record of missing and unerupted teeth and of those extracted for other reasons in a 20 per cent sample of all the employees in the study.

Consideration is given first to the percentage of all teeth affected or extracted, and then to the susceptibility of individual teeth, both in terms of the percentage ever affected and the percentage extracted for the condition.

PERCENTAGE OF ALL TEETH AFFECTED

The percentage of teeth affected by periodontal disease increased rapidly with age (Table 4). In both sexes the percentage was less than 1 per cent at ages under 25, but then rose sharply and uninterruptedly in each succeeding age group. The percentages were consistently lower among women than among men.

The percentage of teeth extracted for periodontal disease was less than 1 per cent at ages under 35 in both sexes, but increased rapidly in successive age groups (Table 4).

UPPER AND LOWER TEETH

Both in regard to the percentage of the teeth affected with periodontal disease and the percentage of teeth extracted because of it, the general level as well as the characteristics by age and sex were much alike for the upper and lower teeth considered as separate aggregates (Table 5). The most important differences were as follows: (1) with but minor excep-

tions, in all the sex and age groups the proportion of the teeth affected was somewhat higher for the lower jaw than the upper jaw and (2) in contrast, the proportion of upper teeth extracted was significantly higher than that of lower teeth in all sex and age divisions.

INDIVIDUAL TEETH

In both men and women the proportion of individual teeth affected tended to increase with age. This increase, however, varied in degree for each tooth. Even more important is the fact that significant differences among the individual teeth were found in regard to the proportion affected. Certain definite patterns exist. Because of the great amount of detail in this part of the analysis, only the major characteristics are presented in the text, but Table 6 gives the complete facts.

Upper Jaw • In the upper jaw the teeth that were most susceptible to periodontal disease were the left molars, particularly the left first molars. Thus, in men age 35 to 39, the percentage of left first molars affected was 14.7 per cent, and for the other molars it ranged from 9.4 per cent for the right second molar to 12.1 per cent for the left second molar. Similarly, among women age 35 to 39, 14.5 per cent of the left first molars were affected, and the range for the other molars was from 10.4 per cent for the right third molar to 14.1 per cent for the left third molar. Thus, for men in this age group, the percentage of affected molars was generally smaller than for women. This pattern was fairly consistent, except that in the older men the percentage was highest for the left third molar. For example, at ages 55 to 59, 63.8 per cent of the men had that tooth affected as compared to 58.8 per cent for the left first molar and 56.5 per cent for the right first molar.

The least susceptible teeth in the upper jaw were the cuspids. Thus, in men at ages 35 to 39, the percentage affected was 5.5 per cent for the right cuspid and 5.9 per cent for the left cuspid. The corresponding values for women were 4.6 per cent and 4.8 per cent respectively. In general, in the upper jaw the percentage of the central incisors and the bicuspids affected was intermediate between that for the molars and the cuspids. In men up to age 45 the percentage of the upper central incisors affected was for the most part higher than

Table 5 • Percentage of upper and lower teeth affected by periodontal disease or extracted for it, * by sex and age of employee

Age	Total affected				Extractions			
	Men		Women		Men		Women	
	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
16-19	.9	.7	.4	.6	—	—	—	—
20-24	.6	.7	.8	1.1	—	—	†	†
25-29	2.1	2.6	1.7	2.1	.2	†	.1	.1
30-34	4.0	4.4	3.5	4.0	.5	.4	.2	.1
35-39	9.0	10.7	8.7	8.8	1.7	1.2	1.8	.9
40-44	13.3	14.9	12.5	12.7	3.1	2.2	2.2	1.3
45-49	21.7	22.6	17.6	19.9	7.0	4.7	5.7	4.0
50-54	25.4	28.0	23.3	24.6	12.9	8.5	8.1	4.3
55-59	36.8	36.5	29.9	29.9	17.6	12.5	13.1	8.1
60-69	40.2	45.2	30.8	36.1	18.7	13.1	17.2	14.8

*Computations based on number of teeth exposed to risk of periodontal disease, that is, excluding teeth missing, unerupted or extracted for reasons other than periodontal disease.
†Less than .05 per cent.

the percentage of bicuspids affected, but in the older ages the percentage was somewhat less for the central incisors than for the bicuspids. In women the bicuspids were more frequently affected than the central incisors in most age groups. In both sexes, the left second bicuspid usually was the most frequently affected of the bicuspids.

Lower Jaw • In contrast with the teeth in the upper jaw, the teeth most frequently affected in the lower jaw were the incisors, particularly the central incisor. This observation applied in men up to age 55 and in women up to age 50, after which age the teeth most frequently affected were the first molars. Thus, at ages 35 to 39 among men, 17.9 per cent of the lower right central incisors were affected and 17.3 per cent of the lower left central incisors. The corresponding percentages for women in this age group were 13.9 per cent and 14.5 per cent respectively. In men at ages 55 to 59, however, the proportion of first molars affected was somewhat over half as compared to somewhat less than half for the central incisors. In women in this age group the percentage for the lower right first molar was 59.6 per cent and for the lower left first molar 36.8 per cent, as compared to 36.6 per cent for the right central incisor and 37.3 per cent for the left central incisor.

The teeth least frequently affected in the lower jaw were the first bicuspids, and next lowest were the cuspids. Thus, in men age 35 to 39 the percentage affected was 6.0 per cent for the left first bicuspid and 6.3 per cent for the right first bicuspid. For women the corresponding percentages were 5.0 and 4.7 respectively. In general, also, the picture was found to be more favorable with respect to the cuspids and the bicuspids than for the molars in the lower jaw.

Whereas in the aggregate the proportion of teeth affected was higher among men than women, the sex difference was relatively small in regard to the proportion of molars affected, especially the first molars. In fact, in many age groups the proportion of these teeth affected was higher for women than for men. The lower over-all percentages for women were due primarily to their consistently lower proportion of incisors, cuspids and bicuspids affected.

INDIVIDUAL TEETH EXTRACTED

With respect to the individual teeth extracted (Table 7), the percentages rose with age in both men and women, but there were appreciable variations in the rate of increase.

For the upper jaw, the pattern of extractions was rather similar to that already described for the proportion of teeth affected, although the percentages were at much lower levels. The upper teeth first sacrificed because of periodontal disease were the molars, and the percentage of these teeth lost was highest in all sex and age groups. Among men at ages 50 to 54, about a fifth of all the third molars had been extracted and about 15 per cent of the other molars. Among women more than 10 per cent of the upper molars had been extracted in this age group. In contrast, the percentage extracted was lowest for left upper cuspids, 9.6 per cent among the men and 5.8 per cent among the women in the same age group.

For the lower jaw the pattern of extractions was somewhat different from that shown for the proportion of teeth affected. The lower teeth most frequently extracted were the molars, particularly the first molars. Thus, in men ages 50 to 54, 16.9 per cent of the left first molars and 16.0 per cent of the right first molars were extracted. More than 10 per cent of the other lower molars had been sacrificed in this age group. Among women the percentage of first molars extracted was 12.8 per cent for the left first molar and 11.7 per cent for the right. Least

Table 6 • Percentage of individual teeth affected by periodontal disease,* by sex and age of employee

Tooth no.	16-19		20-24		25-29		30-34		35-39		40-44		45-49		50-54		55-59		60-69	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Upper																				
1	—	.4	1.3	.6	3.3	1.3	6.6	2.9	9.9	10.4	19.8	18.8	29.1	35.0	37.8	30.7	48.5	31.3	39.6	17.6
2	—	.4	1.7	.8	3.3	1.7	5.1	3.9	9.4	11.2	17.0	15.6	27.3	23.9	27.4	28.2	44.4	40.0	40.8	40.4
3	—	.7	1.1	1.3	2.6	2.1	6.0	4.5	10.8	13.8	16.7	18.1	29.2	23.9	30.7	34.4	56.5	53.0	38.5	35.3
4	1.6	.4	—	1.0	1.6	1.5	3.1	3.6	8.0	8.6	11.3	10.9	20.5	13.7	24.7	21.2	45.5	31.2	35.0	24.1
5	—	.3	—	.7	1.2	1.3	2.6	3.0	6.4	6.6	10.2	10.9	17.6	14.3	22.0	15.4	35.1	24.3	33.6	30.0
6	—	.3	—	.4	1.4	.6	2.8	1.9	5.5	4.6	8.1	7.2	18.0	10.6	21.3	15.8	26.6	23.2	36.3	32.5
7	—	.4	—	.8	1.4	1.6	4.5	2.6	9.2	6.8	10.5	9.9	18.8	13.4	22.5	20.5	32.7	23.4	41.3	23.4
8	1.6	.3	—	.9	2.1	1.6	3.1	2.6	10.5	6.6	12.3	10.1	18.4	13.3	22.2	20.2	28.9	24.6	41.3	29.8
9	1.6	.3	—	.9	1.7	1.6	3.1	2.6	9.4	7.5	12.7	10.2	17.5	14.8	22.2	22.3	26.1	24.7	41.6	34.0
10	1.9	.3	—	.7	1.8	1.7	2.8	3.0	9.2	7.9	11.0	10.7	17.3	14.7	21.1	17.9	28.9	26.1	41.2	27.7
11	—	.3	—	.4	1.4	.9	3.0	2.0	5.9	4.8	9.3	7.6	15.6	10.5	20.1	17.9	28.4	21.4	34.5	27.7
12	1.6	.3	.8	.6	1.9	1.4	3.4	1.9	6.4	7.3	11.7	11.9	17.9	14.7	24.2	20.9	29.9	30.4	44.2	25.0
13	1.6	.3	—	.9	2.0	1.6	3.1	4.5	8.1	9.0	13.5	12.0	20.6	17.7	25.9	25.6	40.0	27.5	43.7	38.2
14	2.2	.6	1.1	1.6	4.1	3.4	5.5	8.4	14.7	14.5	20.5	21.9	31.3	26.5	29.8	45.3	58.8	42.6	41.9	60.0
15	1.9	.5	2.5	1.1	2.8	3.0	6.0	6.0	12.1	13.8	19.7	17.7	28.5	25.7	32.4	30.2	45.1	40.7	53.6	40.0
16	—	.2	1.4	.6	2.0	1.7	7.6	5.1	11.2	14.1	20.2	19.1	37.4	32.1	39.0	31.4	63.8	50.7	43.0	23.5
Lower																				
17	—	.7	—	1.1	1.5	1.9	5.8	3.1	10.3	9.9	15.6	13.0	20.4	22.8	27.3	28.2	35.1	31.3	38.6	45.0
18	—	.3	.9	1.0	1.9	1.5	3.7	3.8	10.9	9.2	17.6	13.7	21.1	22.4	26.4	29.5	40.0	37.6	45.8	40.0
19	—	.5	1.4	1.9	2.1	2.2	4.7	5.6	12.6	10.1	12.2	15.0	17.8	24.0	30.1	35.9	55.0	59.6	63.5	53.8
20	—	.4	.9	.8	1.1	1.4	2.2	2.6	7.0	5.9	9.1	8.4	13.9	14.8	23.1	16.2	30.2	28.1	35.0	29.8
21	—	.4	.8	.7	1.4	1.0	2.1	1.9	6.3	4.7	8.8	7.0	15.6	12.2	20.1	14.9	24.3	17.8	33.9	23.4
22	1.6	.6	.8	.7	1.7	1.7	3.4	3.8	9.7	7.0	13.1	11.1	20.6	16.5	26.4	21.1	33.0	25.3	39.7	28.4
23	1.6	.6	.8	1.0	4.0	3.1	5.5	4.6	13.7	10.2	18.2	15.6	28.8	22.4	33.8	29.0	40.7	32.4	49.5	35.8
24	1.6	1.0	.8	1.8	6.5	4.1	8.2	7.9	17.9	13.9	25.2	19.1	32.6	26.8	36.9	34.6	47.9	36.6	57.3	48.3
25	1.6	1.0	1.6	1.8	6.5	3.4	8.0	7.6	17.3	14.5	25.3	19.3	31.8	26.5	37.4	34.4	47.3	37.3	56.0	46.7
26	1.6	.8	.8	1.0	3.7	2.4	4.9	4.5	12.7	10.8	18.6	15.4	27.7	22.1	32.2	26.3	39.9	31.0	48.9	35.8
27	1.6	.5	.8	.6	1.7	.9	3.0	2.8	8.0	6.0	12.0	10.3	21.3	14.6	26.7	17.3	29.2	23.8	43.3	34.3
28	—	.3	—	.6	1.3	.6	2.6	1.7	6.0	5.0	8.9	8.0	16.3	12.5	21.3	14.4	26.9	23.6	41.5	26.7
29	—	.6	—	.8	1.6	1.7	2.7	2.7	8.7	6.3	9.3	7.5	15.7	15.6	21.4	18.3	28.0	25.0	44.8	23.5
30	—	.6	1.3	1.5	3.3	3.5	2.3	5.6	10.9	12.5	11.4	17.7	28.9	25.1	27.7	40.7	54.1	36.8	51.5	50.0
31	—	.6	.8	1.0	1.8	1.6	4.0	3.4	9.5	9.1	15.0	12.9	25.4	25.0	27.2	28.9	40.3	30.0	45.6	65.0
32	—	.7	—	.9	.9	2.4	6.9	2.9	9.1	6.8	13.7	11.0	20.3	23.9	24.2	22.9	34.4	31.9	35.8	30.0

*Computations based on number of teeth exposed to risk of periodontal disease, that is, excluding teeth missing, unerupted or extracted for reasons other than periodontal disease.

frequently extracted of the lower teeth were the cuspids. Again taking the data for ages 50 to 54 for illustration (Table 7), among men the percentage of left cuspids extracted was 5.3 per cent, and of right cuspids 5.4 per cent. Among women the corresponding values were 1.4 per cent and 2.7 per cent, respectively.

When comparison between the sexes was made with regard to the percentage of the individual teeth extracted, it was found that it was generally lower in women than in men. The differences were usually most noticeable for the lower cuspids, bicuspids and incisors and least noticeable for the lower molars.

DISCUSSION

The data presented in this paper show the extent and characteristics of the prevalence of periodontal disease in a large, urban, employed group with a preventive dental program. The data include frequencies of the disease and of extractions for it, according to sex and age groups and the various teeth.

The observations generally are in ac-

Table 7 • Percentage of individual teeth extracted for periodontal disease,* by sex and age of employee

Tooth no.	25-29†		30-34		35-39		40-44		45-49		50-54		55-59		60-69	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Upper																
1	1.1	.5	2.6	.8	3.5	2.9	4.6	6.6	14.0	12.4	19.2	14.6	27.2	15.2	22.0	8.8
2	—	.2	.7	.2	2.7	.9	2.8	2.2	9.7	6.6	15.3	10.7	21.9	15.4	15.0	19.1
3	—	.2	.6	—	2.0	1.6	3.6	3.6	9.5	7.6	15.1	12.8	31.5	28.9	17.6	23.5
4	—	—	.5	—	1.7	1.6	2.9	1.4	8.2	5.5	12.5	6.0	23.1	16.5	16.7	13.0
5	—	.2	.5	—	1.4	1.4	2.0	1.4	6.3	6.2	12.5	6.1	16.4	10.7	14.6	17.5
6	—	.1	.2	—	.8	.8	1.4	.8	4.4	3.1	10.8	7.2	13.5	7.3	16.3	17.5
7	—	.1	.6	.2	1.2	1.8	3.1	1.7	4.9	4.3	10.6	7.1	11.8	10.4	18.9	14.9
8	.4	.1	.5	.4	1.6	2.0	2.6	1.5	4.9	3.5	12.5	6.3	13.0	12.8	16.1	10.6
9	—	.1	.2	.4	1.3	2.3	3.3	1.8	4.7	4.5	11.8	6.8	11.5	9.6	17.5	19.1
10	—	—	—	.2	1.0	2.1	3.2	1.3	5.2	5.0	11.0	6.0	13.7	9.9	20.3	17.0
11	—	.1	.2	—	.7	.7	1.7	1.0	4.3	3.0	9.6	5.8	11.8	9.4	15.5	17.0
12	—	—	.8	—	1.1	1.3	2.9	2.5	6.1	6.9	11.4	7.7	13.6	15.2	22.5	15.0
13	.8	—	.8	—	1.7	2.3	3.1	2.8	6.3	5.7	13.3	8.5	19.4	12.5	25.2	23.5
14	.9	.2	.3	.5	2.3	3.2	4.4	3.8	9.7	8.2	15.4	13.1	29.8	16.0	20.9	40.0
15	—	.2	.3	.2	2.1	2.1	5.2	3.3	8.2	6.8	12.5	9.5	20.3	15.7	26.8	17.5
16	.5	.6	.6	1.2	4.9	3.6	7.1	5.5	16.7	10.4	22.1	12.4	35.0	26.0	20.9	14.7
Lower																
17	—	—	.9	—	1.7	2.3	3.4	3.6	5.9	8.0	11.8	6.2	13.5	15.2	16.7	20.0
18	—	—	.5	.2	1.9	1.5	3.1	2.1	6.2	7.1	10.6	8.8	20.0	20.2	23.3	25.0
19	.5	.5	—	—	2.5	2.6	2.9	3.3	7.8	8.8	16.0	11.7	31.3	31.9	30.2	38.5
20	—	.2	.3	.2	1.2	1.0	2.2	1.0	3.6	4.7	8.7	5.3	13.2	11.1	10.5	17.0
21	—	—	.2	—	.8	.6	1.2	.3	3.3	1.8	6.6	4.0	8.0	3.8	7.9	10.6
22	—	—	.2	.2	.4	.3	1.0	.2	2.8	1.9	5.4	2.7	8.2	4.2	7.7	12.2
23	—	—	.2	—	1.1	.5	2.0	.8	3.8	2.8	7.4	3.0	10.4	4.1	10.4	11.9
24	—	—	.2	.2	1.4	.7	2.5	1.0	4.3	2.5	7.8	3.6	12.1	6.4	14.0	15.0
25	—	—	.5	.4	1.1	.8	2.5	1.0	3.7	3.0	8.1	3.4	12.2	4.2	13.7	13.3
26	—	—	.5	.2	1.1	.8	1.6	.9	3.5	2.8	6.5	2.8	9.7	3.1	10.6	11.9
27	—	.1	.2	—	.6	.3	1.2	.4	3.3	1.6	5.3	1.4	8.4	4.9	8.2	13.4
28	—	.1	.2	—	.5	.3	1.3	.5	3.8	2.5	5.9	1.7	9.4	7.4	9.4	13.3
29	—	—	.3	—	1.7	.6	1.5	.9	4.7	5.2	9.1	4.6	10.9	8.7	12.0	11.8
30	—	.5	—	.4	2.2	2.9	3.0	3.3	11.9	10.5	16.9	12.8	29.7	27.9	25.0	30.0
31	—	—	.6	.4	2.0	1.5	3.3	3.3	8.9	8.7	12.9	8.8	20.1	13.1	20.8	30.0
32	.4	.7	2.3	.6	1.2	1.3	4.2	2.3	7.0	6.5	10.6	8.0	16.8	17.0	15.0	5.0

*Computations based on number of teeth exposed to risk of periodontal disease, that is, excluding teeth missing, unerupted or extracted for reasons other than periodontal disease.

†Age groups 16 to 19 and 20 to 24 are not shown because no teeth were extracted in the group 16 to 19 years old and very few at ages 20 to 24, and then only in women.

cord with impressions among dentists with regard to the prevalence of periodontal disease, but one of the primary values of the study is that it gives the subject a sound statistical basis. Consequently, these data have many potential uses. They demonstrate the great size of the problem today and also point up the need for the dental profession to look ahead to the growing importance of the problem. The condition is in high degree closely associated with the aging process. Since the population is growing and an increasing proportion of persons are surviving middle life, the total number of persons affected by periodontal disease is likely to increase at an accelerating rate. The treatment of active periodontal disease and its sequelae will form an increasingly large proportion of dental practice in the future. Accordingly, greater attention needs to be given to the subject both in undergraduate and postgraduate dental teaching and in dental research. The study of the causes of periodontal disease and the role of systemic factors in its development and the possibility of prevention or postponement of the active process must also be considered.

SUMMARY

A detailed statistical study of the prevalence of periodontal disease, based on dental examination of nearly 13,000 employees at the home office of the Metropolitan Life Insurance Company, has been made. This study includes the total prevalence of the condition and of extractions for it and facts on the proportion of the individual teeth affected or extracted. The statistics were analyzed according to age and sex. Among the principal observations are the following:

1. Periodontal disease was increasingly common with advancing age. By age 45 more than a half of all persons were affected, and in most instances the process was active. The prevalence in women was slightly lower than in men up to age 55, and much lower after that age.

2. Extractions for periodontal disease occurred in about one out of every five persons by age 45.

3. In a high proportion of instances a large number of teeth were affected. At ages 45 to 49, 22 per cent of all the men and 16 per cent of all the women had more than eight teeth affected, and 11 per cent of the men and 7 per cent of the women had more than 16 teeth affected. In terms of the number of persons affected with the condition, these percentages are approximately twice as high.

4. More than eight teeth had been extracted for this condition in 5 per cent of all the men and 4 per cent of all the women at ages 45 to 49. More than 16 teeth had been extracted in 3 per cent of the men and 2 per cent of the women in this age group. The corresponding percentages based on persons with extractions for periodontal disease are four to five times as high.

5. On the basis of the number of teeth exposed to risk of the condition, 22 per cent of the teeth in men and 19 per cent of the teeth in women were affected at ages 45 to 49, and 6 per cent had been extracted in men and 5 per cent in women of this age.

6. A somewhat greater number of lower teeth were affected than upper teeth, but many more upper teeth had been extracted for periodontal disease than lower teeth.

7. In the upper jaw the teeth most susceptible to periodontal disease were the left molars, particularly the left first molars; the least susceptible teeth were the cuspids. In the lower jaw the most

susceptible teeth were the incisors, particularly the central incisors, except in the older age groups; the least susceptible teeth were the first bicuspids.

8. In the upper jaw the teeth most frequently extracted for periodontal disease were the molars; the teeth least frequently extracted were the cuspids, except after age 60. In the lower jaw the teeth most frequently extracted were the molars, particularly the first molars; the teeth least frequently extracted were the cuspids.

One Madison Avenue

Role of auxiliary personnel in augmenting services of the dentist

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One of America's most successful businessmen once was introduced as the smartest salesman in the country. He replied:

> I am not a smart salesman; I am a smart buyer. If you buy the right thing at the right time for the right price, you do not have to sell it—the public will clamor for it, and buy it at a price that will be mutually profitable.

Dentists too are buyers. They buy an education, a degree and a license to practice. For these preparatory necessities they pay much money and many long hours of labor and study. They must also buy an office and a minimum amount of equipment necessary to conduct a practice. They have the privilege of buying more complete and more efficient equipment, they have the privilege of buying the advice and service of interior decorators and dental efficiency experts, and, finally, they have their greatest privilege, that of buying the services of dependable executive secretaries, capable dental hygienists, efficient chair assistants and skillful dental technicians. Dentists also have the privilege of buying the services of gum-chewing "hello girls," glorified scrub ladies, halfhearted tooth polishers, and inefficient pseudo dental mechanics.

The successful businessman said that the secret of success lies in smart buying. If the dentist wants to be a smart buyer of auxiliary services he should know what to buy, when to buy and whether to buy at all.

In making these decisions, the dentist must determine what he expects to give to dentistry and what he expects to receive from it. Does he just want to make money? Does he want to render a superior service for a few people? Or is he willing to strive earnestly to provide better dental service for more people? If the dentist expects to give as little as possible and take as much as possible, he

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need not buy the best auxiliary services —second- or third-rate services will suffice. If he is sufficiently skillful he can render a superior service for a few people without the aid of auxiliary personnel. If he wants to give the most to dentistry and receive its greatest rewards, however, he will search diligently for methods by which he can help his profession achieve its only justifiable objective, that of rendering more and better service to more people.

Before considering the methods and procedures of achieving this objective it seems wise to review a few statistics that may indicate the need for revised thinking on the conduct of a dental practice. The civilian dentist-patient ratio in America, at present, is about 1 to 1,900; however, the ratio of practitioners to civilian population is about 1 to 2,100.[1] To maintain this ratio, a net increase of 1,420 active dentists will be required each year. The present net increase, however, is about 1,100 new dentists annually.[2] Unless the present annual net increase is increased by the establishment of new dental schools, or by enlarging the capacity of present schools, no help may be expected through an increase in dental manpower. In fact, if present trends continue it will be necessary for each dentist to serve even more people than he serves today. According to Moen,[3] 42 per cent of the American population avail themselves of dental services in any one year. The average dentist treats approximately 1,000 patients per year.[4]

If the dentist attempted personally to give an adequate prophylaxis and clinical and roentgenographic examinations to 1,000 persons, these services alone would require approximately 2,000 hours. No time would be left in the year for him to furnish the services which only he is qualified to render. It is obvious that a dentist is definitely limited by time and strength in his efforts to render better service to more people. In fact, under present circumstances he cannot care adequately for the dental needs of his share of the population.

POTENTIAL OF AUXILIARY PERSONNEL

If the goal of the dental profession is better dental service for more people, the only hope of attaining it lies in the intelligent use of auxiliary personnel.

Today there are approximately 75,000 dentists in private practice in the United States.[1] Of this number only 70 per cent employ one or more persons on a full-time basis.[5] The dentist increases his weekly patient load approximately 36.8 per cent by employing one auxiliary, and 68.8 per cent when he employs a second.[6] Thus, if the dentist working alone is able to render an adequate service for ten patients per day, he will be able to serve 16 to 18 patients in the same time if he intelligently uses the services of two well-trained employees provided he has at least two, preferably three, well-equipped operating rooms, and that his office is efficiently designed and adequately equipped.

There are approximately 8,000[7] dental hygienists in active practice today in this country, or about one hygienist to every 100 dentists. There are about 20,000 dental technicians employed by commercial

1. American Dental Association, Bureau of Economic Research and Statistics, Memorandum, Sept. 30, 1954, p. 1.

2. Evaluating committee reports, University of Michigan workshop to study organization of scientific dental health service to more people, Sept. 6-12, 1953, Ann Arbor, Mich., p. 30. (Mimeo.)

3. American Dental Association, Bureau of Economic Research and Statistics. The 1953 survey of dental practice, 1954, p. 32-34.

4. American Dental Association, Bureau of Economic Research and Statistics. The 1953 survey of dental practice, 1954, p. 31.

5. American Dental Association, Bureau of Economic Research and Statistics. The 1953 survey of dental practice, 1954, p. 27.

6. Evaluating committee reports, University of Michigan workshop to study organization of scientific dental health service to more people, Sept. 6-12, 1953, Ann Arbor, Mich., p. 32. (Mimeo.)

7. Evaluating committee reports, University of Michigan workshop to study organization of scientific dental health service to more people, Sept. 6-12, 1953, Ann Arbor, Mich., p. 26. (Mimeo.)

laboratories, and about 3,500 employed in the offices of dentists. No accurate figures are available on the number of dental assistants, but the 1950 survey[7] indicated that approximately 55,200 were employed in dental offices at that time.

From these statistics three conclusions may be reached. First, the dental profession as a whole is not utilizing the maximum potential of auxiliary services. Second, the intelligent use of auxiliary personnel can almost double the patient load which a dentist can carry, and enable him to render a better service for more people. Third, there is a definite shortage of trained auxiliary personnel. Only four schools offer a formal educational program for the training of dental technicians, and few dental schools have developed a program for the training of dental assistants. A few nonprofessional schools offer training in dental assisting as part of their vocational program, thus helping in a very small way to supply the demand. Thirty-one schools offer courses in dental hygiene. This number has been steadily increasing as demand for this type of auxiliary exerts its influence. For example, the total enrollment of 958 dental hygienists[8] in 1948 jumped to 1,938 in 1954.[9]

How and when should the dentist begin to utilize the services of auxiliary personnel? The best time to start is the day the young graduate opens his office. It is far easier to begin immediately to develop sound methods of practice than to drift along expecting some day suddenly to revise office procedure. Too often the line of least resistance becomes the guiding influence in a young dentist's career, and another potentially excellent practitioner fails to attain his full professional goal of usefulness. It is not impossible, however, to teach an old dog new tricks, and any dentist who honestly wants to improve and extend his services can do so by giving up many of his present ideas, and learning how to employ well-trained auxiliary personnel.

THE DENTAL ASSISTANT

The recent graduate needs only one auxiliary, but that assistant must be capable of rendering a number of services. If the dentist does not know how to use an efficient assistant, or even worse, does not know one when he sees her, the sooner he finds out the better. The best way to find this out is to visit the office of a dentist who does know how to operate with skilled assistants. After one or two such visits the young dentist will have a better idea of what qualities he should seek when employing and training his first assistant.

Usually the dentist just starting in practice will have ample open time in his appointment book which is not economically profitable, but nevertheless has its advantages. It enables him to take personal interest in the welfare of his patients, to explain their dental problems, the reasons for them, and the proposed treatment. This personal attention takes time which the older dentist does not always have. Another advantage is that the dentist will have plenty of time to teach his new assistant all the things she must know to become efficient. These hours of instruction are well spent, since never again will the dentist have so much time to devote to training. The training of future assistants will be largely the responsibility of this first employee; therefore, it is extremely important that she be intelligent, industrious and enthusiastic, and that she be well-grounded in all the technics, procedures and practices of that office.

All the duties of this first assistant cannot be listed here, but generally she should assist at the chair, develop and mount roentgenograms, help with the

8. Evaluating committee reports, University of Michigan workshop to study organization of scientific dental health service to more people, Sept. 6-12, 1953, Ann Arbor, Mich., p. 27. (Mimeo.)

9. American Dental Association, Council on Dental Education, Dental students' register, 1954-1955, table 12.

laboratory work, be a good housekeeper, do the bookkeeping and secretarial work, and be the kind of receptionist that instills confidence and demonstrates hospitality. Two points need emphasis. First, the neophyte dentist should delegate the bookkeeping, banking and collection of accounts to his secretary or assistant, so that he will not develop a habit which later will rob him of profitable time. Second, every patient should be greeted and made comfortable immediately on entering the reception room. This rule is so important that the assistant would be justified in leaving in the middle of a cement-mixing operation to answer the doorbell. It must be remembered that no one likes to be ignored even for one minute.

THE DENTAL TECHNICIAN

The modern, conscientious, ambitious young dentist must have a philosophy of dentistry that transcends the mere filling of cavities and empty spaces. He must realize that his job is not merely to save a tooth, but to save a mouth. He must realize that the jaws and associated structures are a part of a complex physiological organ, and that the organ must be studied, and its condition diagnosed and treated as a unit. To practice dentistry according to this idea, the dentist must have an accurate knowledge of the normal function of the teeth and associated structures; he must be able to diagnose all abnormalities of the mouth and recognize whether he himself is capable of treating them or whether he should refer the patient elsewhere for treatment. Much of his practice will be in the restorative field, and if he is to render the most effective service in this field he should employ his own laboratory technician.

The second member of the auxiliary personnel should be this technician. The dentist starting in practice also has time —time that he will never have again— to work with the laboratory technician in perfecting technical procedures. He should select an intelligent and talented young man who wants to make a career of the technical side of dentistry, to take him into his office and then "grow up" with him. They should study together, attend meetings together, and develop together the best methods of coordinating operatory and laboratory procedures.

Dentists who think that they cannot keep their own technician busy should consider that with the use of modern high-speed operative procedures and time-saving technics and the services of an efficient chair assistant, the chair time required for operative dentistry, crown and bridgework and partial prosthodontics is about a third to a fifth that required for the laboratory work. If a dentist cannot keep a laboratory technician busy, either he is not carrying his share of the patient load, he is not operating efficiently, or he is not providing the restorative treatment necessary to attain and maintain the optimum oral health of his patients. Since only one dentist in about 25 employs a private laboratory technician, the profession might reduce that ratio in its effort to increase the quality and the quantity of its service.

THE DENTAL HYGIENIST

By the time the dental assistant has become efficient and the technician sufficiently skillful to fabricate high quality restorations, the dentist will begin to realize that he cannot begin to take care of the patients on his recall list. Some desirable patients will go elsewhere and others, in need of extensive treatment, will suffer from lack of prompt attention. Long before this situation occurs the dentist should employ the third member of the auxiliary force—the dental hygienist.

If the dentist has been trying to render adequate service to as many as 500 patients per year he will have, by employ-

ing a good hygienist, 25 additional weeks of 40 hours each to devote to treatment, correction and restorative services. The addition of a hygienist to the staff will provide two well-trained people to explain the benefits of modern dentistry and the value of a clean, normally functioning oral mechanism; two instead of one to look for an oral pathologic condition, explain the reasons for dental disease, and suggest dietary corrections. In addition the dentist will be relieved to a great extent of rendering such services as prophylaxis, roentgenographic examination, instruction in home care, advice regarding fluoridation, and many other important but time-consuming activities.

One of the greatest values of the hygienist is her ability to maintain constant contact with the patients of her dentist employer. Unless patients are called and given definite appointments, many will not return for a periodic examination and prophylaxis. The hygienist is invaluable in the patient recall program and a "must" if a better dental service is to be rendered to more people.

The first duty of the new hygienist is to put the recall list in order. She should then begin to call for appointments those patients who are due for their periodic prophylaxis and examination, always allowing some time for those who are six months, one, two or more years past due. As the hygienist gradually contacts all the persons on the recall list, both she and the dentist will be amazed at the number of desirable patients who have drifted away because the dentist did not have time to render the service which they desired. Some of these patients will return when they discover that the dentist has a hygienist; thus she will render another valuable service to the dentist and to those whom they both desire to serve.

THE EXECUTIVE SECRETARY

Long before the hygienist has talked with all the patients on the recall list, the dentist will be booked solid several weeks ahead, the laboratory technician's work will be two or three weeks behind schedule, the hygienist will no longer have time to call her patients, and the dental assistant will be thoroughly overworked. The time has now arrived for employment of the executive secretary—the fourth member of the auxiliary team.

The executive secretary is the key to the modern, efficient, smooth-running dental office. Where will she come from? What are her duties? The first person to consider for this position is the dental assistant, especially if she has grown up with the practice. She knows the patients personally, she knows the various office routines, she knows both the strong points and weak points of her dentist employer. If she has enthusiasm, executive ability, and if she is capable of handling people, she is elected for this new position. It is far more important that she be skilled in human relations than in the use of pen or typewriter. She can learn bookkeeping, typing, banking and other business procedures.

If the assistant does not fulfill the aforementioned specifications, the dentist should employ the best executive secretary he can find, even though she may know nothing about dental practice. If she is the right type she will learn her part of the work very rapidly, since sound business principles, personnel problems, and satisfactory human relations are little different in the dental office than in any organization which deals intimately with people.

The executive secretary must be able to make decisions, and she should know which decisions require consultation with the dentist and which do not. She is a sort of liaison officer between the dentist and the patient. She should be able to act for the dentist in handling misunderstandings about the type and amount of service rendered, the fee charged, the method and time of payment, and many other patient dissatisfactions. Most of

these problems, however, can be avoided if the dentist, after a thorough study of each case, will make a diagnosis, recommend a definite plan of treatment, and quote an exact fee for the service outlined. This information should then be turned over to the executive secretary who, after conferring with the laboratory technician, should schedule a series of appointments for the patient. She should be sure that the appointments are of sufficient length to conserve both the patient's and the dentist's time, and that they are spaced so as to permit good coordination of chair and laboratory procedures.

The executive secretary at the beginning of a series of appointments, should also have a definite understanding with the patient as to the time and method of payment. This arrangement is especially important as she has complete charge of all the finances of the office, and is solely responsible for the collection of all accounts and the payment of all bills and salaries pertaining to the office. Usually the dentist is far better off if she also has charge of his personal finances.

By the time an executive secretary is needed in a dental office, the patient load of the hygienist will be so great that it is no longer practical or economical for her to handle her own patient recall system. The patients, the dentist, the hygienist and the secretary will all benefit if the recall system is handled entirely by the secretary. The hygienist can well afford to have a small amount deducted from her commission and paid to the secretary for each appointment made and kept. This will be an incentive for the secretary to see that the hygienist has a full schedule at all times and the hygienist will benefit greatly since her time is much more valuable at the chair than on the phone. The value of this system to the patients and to the dentist is obvious.

The executive secretary is the office manager, and must have the authority that goes with the responsibility of her position. All other office personnel, including the dentist, should realize this, and no decision concerning the handling of patients or any other office procedure should be made without her knowledge and approval. The secretary should make and answer all phone calls, and should have complete charge of all appointments for both the dentist and the hygienist. Any deviation from this procedure will invite trouble and lead to confusion and discord.

COMMENT

It is the author's conviction that the number and type of auxiliary personnel as outlined are necessities if the dentist is to reach his maximum potential in patient load and is to render a better dental service to more people. In an amazingly short time a practice built and operated on these principles will need a second technician, and soon an associate dentist. The associate dentist will need a chair assistant, who in her spare time can assist the secretary and the laboratory technician. The second hygienist comes next, then the third laboratory technician, and then the second associate dentist. Thus the dentist builds a complete organization, the further growth of which is limited only by the imagination and personal desires of the members of the organization.

CONCLUSIONS

1. A dentist cannot provide the utmost in service without the efficient use of sufficient auxiliary personnel.

2. Many dentists do not, at present, know how to use auxiliary personnel effectively.

3. It is possible to render a service to more people by utilizing the facilities of the commercial laboratory, but the best method of rendering this service is by the dentist employing his own private technician.

4. The coordinated efforts of the executive secretary and the dental hygienist are necessary if the busy dentist is to make his program of recall, prophylaxis and examination completely effective.

5. An organization such as is described in this paper offers many advantages to both the patients and the dentist. These advantages are:

A. The office routine and services are not disrupted seriously by vacations and illness.

B. Emergencies can be handled quickly and easily.

C. Ease and frequency of consultation are facilitated between dentist and staff in the interest of the patient.

D. Several individuals, instead of one, in an office, by acting as receivers and exchangers of information, keep the organization informed on the latest developments in technical procedures. They may also keep them posted on the most recent findings in dental research.

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Effects of water sorption on retention of acrylic resin denture bases

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The fact that acrylic resin absorbs water and swells has long been established. Skinner[1] has pointed out the following:

In two investigations it was shown that . . . the swelling brought about by water sorption compensated for the curing shrinkage, whereas the third . . . showed that the swelling overcompensated. . . .

Sweeney, Paffenbarger, and Beall[2] were responsible for the latter conclusion, that expansion due to water sorption was greater by as much as 0.65 per cent than the curing shrinkage of the specimens studied. This was evidenced by the fact that after immersion the samples not only gained weight, but also exhibited linear dimensional changes. For one series of plates, the dimensions had become virtually constant by the end of four months. Peyton and Mann,[3] using micrometer caliper measurements to study acrylic resin samples designed for restorative work, wrote one of the two papers deducing that the expansion caused by water sorption was for all practical purposes equal to the original curing shrinkage of the material.

Skinner and Cooper[4] later carried out extensive investigations of the curing shrinkage of denture base plates made of five acrylic resins and the corresponding dimensional changes after storage in

Based on work performed by the author while a graduate student at Northwestern University Dental School; at present, member of the dental research group, University of Rochester School of Medicine and Dentistry.

1. Skinner, E. W. Acrylic resins: an appraisal of their use in dentistry. J.A.D.A. 39:261 Sept. 1949.

2. Sweeney, W. T.; Paffenbarger, G. C., and Beall, J. R. Acrylic resins for dentures. J.A.D.A. 29:7 Jan. 1942.

3. Peyton, F. A., and Mann, W. R. Acrylic and acrylic-styrene resins: their properties in relation to their uses as restorative materials. J.A.D.A. 29:1852 Oct. 1942.

4. Skinner, E. W., and Cooper, E. N. Physical properties of denture resins: Part I. Curing shrinkage and water sorption. J.A.D.A. 30:1845 Dec. 1943.

water. Half of the trial plates were processed by compression molding and half by injection molding, and they were soaked at 37°C. for at least three weeks before measurement. Shrinkage or expansion was determined as the linear percentage difference between gauge marks on the original model and their impressions on the polymerized specimen. It was concluded that the net change very nearly compensated for the curing shrinkage. Moreover, the amount of both shrinkage and expansion seemed entirely independent of the method of molding. Only changes so slight as to be of no practical significance took place after the first three weeks of immersion.

More recently, Grunewald, Paffenbarger and Dickson[5] obtained comparable results as to the lack of important differences in the effects of injection molding or compression molding processes on the water sorption of the acrylic resins. The amount of water taken up by the denture blanks tested was expressed as a percentage increase in weight when the specimens were stored in water at 21°C. and weighed at intervals during an eight month period. After approximately 100 days, a leveling off in weight gain occurred.

Dimensional changes accompanying water sorption during the first three weeks after curing were determined both for the denture blanks and actual dentures by means of appropriate reference marks and a measuring microscope. In neither the injection molded nor the compression molded blanks did the resulting expansion fully compensate for the original curing shrinkage, though in the injection molded blanks, over-all average contraction was reduced from 0.40 to 0.18 per cent, whereas in the compression molded blanks, it was reduced from 0.26 to 0.12 per cent. Furthermore, little or no expansion occurred in the actual dentures when they were kept in water under the same conditions for three weeks. Thus, this work adds a third conclusion to the two reported by previous investigators; namely, that expansion due to water sorption fails to make up fully for curing shrinkage.

The work of Atiyyah[6] bears out to some extent these apparent discrepancies. He employed denture bases fabricated of three different acrylic resins. Into each baseplate he incorporated four pins as reference points, from which linear measurements were taken with the measuring microscope. The determinations of dimension were made at intervals of four and eight weeks after immersion of the plates in water at room temperature. The differences were calculated in terms of percentage of change. Atiyyah found that in general the net change in dimension varied greatly in different parts of the same denture and that the pattern of this warpage was rather unpredictable.

An investigation relating directly to the effects of water sorption on the retention of dentures is described by Skinner and Chung.[7] They used a master model of the maxilla, overlaid with an elastomer resin, and constructed acrylic resin baseplates on it according to various designs. The force necessary to dislodge the plates from the model was measured. Between experiments the plates were kept in water at room temperature. Retestings after 8, 16, 31 and 56 days' immersion showed that retention increased progressively with water sorption up to approximately 31 days, after which it tended to remain more or less constant.

Skinner[8] has observed that such swelling, apparently due to the entrance of water between the molecules of the poly-

5. Grunewald, A. H.; Paffenbarger, G. C., and Dickson, George. Effect of molding processes on some properties of denture resins. J.A.D.A. 44:269 March 1952.

6. Atiyyah, A. R. Dimensional changes of acrylic resin denture bases as influenced by the method of processing. Master's thesis, Northwestern University Dental School, 1945.

7. Skinner, E. W., and Chung, P. Effect of surface contact in the retention of a denture. J. Pros. Den. 1:229 May 1951.

8. Skinner, E. W. Science of dental materials, ed. 3, revised. Philadelphia, W. B. Saunders, 1946, p. 93.

methyl methacrylate, occurs to the greatest extent during immersion of the resin at 37°C. (body temperature) for the first week. Afterward, perceptible increases continue for six weeks or longer.

From the foregoing it is apparent that, apart from linear measurements and weighing of specimens, there is an additional, and in some ways more significant, method of determining the effects of water sorption on acrylic resin denture baseplates. This method involves measuring by some means the resulting changes in retention. Since the first two methods, by their nature, can throw little light on the manner in which such changes take place, that is, on warpage, the third method becomes of interest.

MATERIALS AND METHODS

This study is a report on the effects of water sorption on the retention of acrylic resin denture baseplates. Tests were made of several series of baseplates, employing both a laboratory method similar to that devised by Ostlund[9] and Skinner and Chung[7] for studies of denture retention and a clinical apparatus used previously by the author[10] in an examination of other aspects of retention.

The two series of baseplates used in the preliminary, nonclinical experiments were constructed to fit a model built up of an elastomer resin to simulate the soft tissues of the maxillary arch. An aluminum model of an edentulous upper jaw without undercuts was overlaid with an elastomer resin (Dicor-D) to represent the soft tissues. Nine acrylic resin denture baseplates were made to fit the master model, following the procedures to be described later.

Measurement of the relative retention of the baseplates when placed on the master model was carried out on an apparatus consisting of a beam balance (sensitivity 0.1 Gm.) from which the balance pan on the weight side had been replaced by a suspended metal can. When the apparatus was in use, water, flowing at an even rate, filled the can until its weight, recorded in grams, unseated the denture forcibly from the model, which was seated beneath the opposite beam of the balance.

A "harness" of heavy nylon fish line, with three hooks tied together in such a way that each could move on the line and seek a balanced relationship with the others, was attached to the beam above the model. When the baseplate was seated on the model, these hooks engaged three wire staples, or eyes, of 18 gauge orthodontic wire, cured in the acrylic resin baseplate in the following positions: no. 1 in the central incisor region and no. 2 and 3 in the second molar regions.

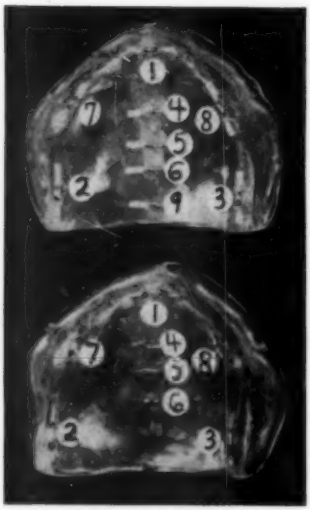
Before each test, both model and baseplate were painted with water on the contacting surfaces. Pressure on the plate to ensure uniform contact was supplied by a weight of 3 kg. placed on the plate and left in place for five seconds. Between the tests the baseplates and the master model were stored in water at room temperature.

Six compression molded and three injection molded plates of acrylic resin (clear Coe Acrylic), constructed on stone duplications of the master model, were tested. The compression molded plates were processed by the water bath method.

The system just described was later adapted to measure retention in the mouth. Careful selection was made of the edentulous subject, especially as to the requisite of a maxilla without undercuts. The apparatus, which, with the method of procedure, is described in greater detail in an earlier report,[10] provided for the application of a force to unseat the

9. Ostlund, S. L. G. Some principles in the retention of dentures. (Abst.) Northwestern Univ. Bul. 49:11 Nov. 22, 1948.

10. Skinner, E. W.; Campbell, R. L., and Chung, P. Clinical study of the forces required to dislodge maxillary denture bases of various designs. J.A.D.A. 47:671 Dec. 1953.



Plates 1 and 2. Note position of eyes. Above: Plate 2, made from alginate impression. Below: Plate 1, made from paste-wash impression

denture at right angles to whichever eye in the denture base had been selected for attachment. In this instance, the measure of retentive power was assumed to be the force furnished by a small, hand-operated windlass, measured in ounces by a spring dynamometer. In consideration of both the tendency of acrylic resin to deform under stress and the safety of the patient, the force applied was never allowed to exceed 192 ounces, whether or not the plate remained *in situ*.

The two baseplates constructed for testing in the mouth were derived from two different impressions, that for plate 1 having been obtained by the Schlosser technic, consisting of a zinc oxide-eugenol wash, and that for plate 2 from an alginate impression. Incorporated into the acrylic resin were a number of eyes of 18 gauge orthodontic wire (illustration). Compression molding and water-bath curing were used. These baseplates were immersed in water at room temperature when not in use, in the same manner as those in the preliminary series.

DISCUSSION

Tables 1 and 2 record the results of the laboratory investigations on a series of compression molded and injection molded acrylic resin baseplates. In the first instance (Table 1), the six compression molded plates were tested after five days' immersion in water at room temperature and then retested after an additional ten days' immersion. It will be noted that in every instance the longer period of water sorption resulted in an increased retention. This increase was expressed by the greater weight in grams necessary to dislodge the plate from the master model. For example, with plate 1, retention increased from 239 to 268 Gm., whereas with plate 5, retention rose from 306 to 397 Gm. in the same period.

Although originally the force necessary to dislodge the plates varied rather widely among the six in the series—from 158 to 400 Gm.—the increased retention after ten additional days in water appeared consistent with the results of the first trial of each individual plate. The large initial variation in the series appears to emphasize the practical impossibility of the accurate duplication of a denture, at least so far as retention is concerned.

With the three injection molded plates (Table 2), the time interval was not so long, nor the rise in retentive power correspondingly so great. Each plate was tested for the first time after approximately two days' storage in water and retried on the following day. Plate 1 showed in this instance no significant change and plates 2 and 3 exhibited increases of 23 and 51 Gm., respectively. Thus, the average increase for one 24 hour period was 24.0 Gm.

Table 3 shows the effects of varying periods of water sorption on plates 1 and 2 of the clinical series. The initial trials for plate 1 took place after 30 days' im-

mersion in water at room temperature, and the second ones took place after 55 days' further immersion. Plate 2 was tested originally after six days in water and was retested 67 days later. All the areas in which the force applied could unseat the plate showed a rather substantial increase in retention at the end of the 67 additional days' water storage, except for no. 5, located in the midline of the palate toward the posterior, which unaccountably exhibited a decrease (Table 3). Since in the first instance, the force applied failed to unseat the plate at 192 ounces, however, there is no way of ascertaining the actual amount of decrease. For this reason, an average increase computed for this plate would lack significance. Nevertheless, the overall picture apparently does not differ materially from that of plate 1.

Thus, the observations for both series of tests, laboratory as well as clinical, bear out the work of Skinner and Chung in that increased water imbibition over a period of time is reflected in increased retention. The observations diverge, however, in that instead of remaining at a constant level after approximately one month, retention (and therefore presumably water sorption) appeared to increase progressively for a much longer period in the present study. For example, in the clinical experiments, plate 1 was not tested until 30 days had elapsed, and all the progressive increase subsequently recorded took place in the following 55 day period. In both studies, the plates were kept immersed at room temperature between experiments.

Table 1 • Effect of water sorption on retention of six compression molded, acrylic resin plates tested in the laboratory

Plate	Retention (in Gm.)*	
	After 5 days' immersion	After 15 days' immersion
1	239	268
2	400	475
3	374	383
4	158	247
5	306	397
6	256	264

*Each result is an average of six or more trials.

Table 2 • Effect of water sorption on retention of three injection molded, acrylic resin plates tested in the laboratory

Plate	Retention (in Gm.)*	
	After 2 days' immersion	After 3 days' immersion
1	224	222
2	205	228
3	148	199

*Each result is an average of six or more trials.

Skinner and Cooper,[4] who employed immersion at body temperature, observed that the greatest quantity of imbibition took place during the first week of immersion, the most effective portion during the first three weeks, with only barely perceptible evidences of the process for the remainder of the first six weeks and perhaps slightly beyond.

On the other hand, in two of the other studies reviewed, the apparent effects of progressive water imbibition tended to manifest themselves over much longer periods. Thus, Grunewald, Paffenbarger and Dickson, who kept their specimens in water at approximately room temperature between periodic weighings, recorded increases in weight up to the end of 100 days. Over a four month span the two complete upper dentures in service tested by Sweeney, Paffenbarger and Beall,[2] exhibited linear dimensional increases. The dentures were presumably stored in water at room temperature when not in use. Thus, the results in the present study appear to be more in line with those of these latter investigations.

The computations just discussed are based on changes in either weight or linear measurements. This fact suggests that other factors, such as warpage, may count more when retention is the chief criterion. Such speculations tend to

Table 3 • Effect of water sorption on retention of two plates tested clinically

Plate	Eye	Retention (in ounces)*	
		After 30 days' immersion	After 85 days' immersion
1	1	192+	192+
	2	29.7	34.2
	3	25.4	53.0
	4	192+	192+
	5	192+	192+
	6	32.5	48.5
	7	192+	192+
	8	192+	192+
		After 6 days' immersion	After 73 days' immersion
2	1	192+	192+
	2	18.6	62.4
	3	24.8	44.8
	4	192+	192+
	5	192+	99.2
	6	20.5	76.8
	7	192+	192+
	8	192+	192+
	9	17.1	59.2

*Each result is an average of at least five trials.

arouse interest in further elucidation of the matter, through a project in which the same baseplate specimens could be compared both by linear measurements and by tests of retention.

The mechanism by which retention is abetted through water sorption is not clear. It would appear that, should the curing shrinkage of the resin be nearly exactly compensated later by the expansion accompanying imbibition, as indicated in the work of Skinner and Cooper, and of Peyton and Mann, the improved retention could be merely the direct consequence of the restoration of accurate fit to the denture base. In other words, a more exact conformity to the denture-bearing surface would be re-established. On the other hand, should curing shrinkage tend to be overcompensated with the passage of time, as reported by Sweeney and others, presumably a point should be reached eventually when the fit of the denture would be affected adversely unless it was dependent for the most part on factors other than the complete conformity of the baseplate to the underlying tissues.

The divergent results of the various investigations as to compensation, overcompensation or failure of compensation for curing shrinkage by water imbibition are somewhat difficult to evaluate. It may be that the foundation for the divergence rests on differences in the technics used in the various experiments. For example, Sweeney, Paffenbarger and Beall,[2] reported that water imbibition had the result of overcompensating for curing shrinkage; however, they not only employed a technic of processing which in effect shut off the denture blank during polymerization from obtaining much water from the plaster of paris (the denture blank was molded on a stainless steel die and tin foil was used on the side of the blank that would normally be in contact with the tongue), but they also conditioned the finished dentures at 32 per cent relative humidity before making the determinations. On the other hand, Grunewald and his co-workers expressed the opinion that certain of their specimens, which exhibited little or no dimensional change after water storage for three weeks, probably were almost saturated with water at the end of the manufacturing process. In view of this apparent lack of agreement among the several investigators, the fact that in the study here reported water imbibition proved an aid in retention, most logically through the progressive restoration of original dimensions, may be of some significance.

The results in the series of laboratory tests, nevertheless, appear to corroborate the observation of Skinner and Cooper[4] and of Grunewald, Paffenbarger and Dickson,[5] that in regard to water sorption, injection molded baseplates do not differ materially from compression molded plates. Skinner and others noted, however, that, theoretically, since the resin during injection molding is kept under pressure throughout the entire

process, the shrinkage should be compensated at the outset by the forcing in of excess resin. In this instance, however, because the intervals of testing varied so widely between the two types of specimens, comparisons probably should not be relied on too heavily.

SUMMARY AND CONCLUSIONS

Two sets of acrylic resin denture baseplates were studied, the first in the laboratory and the second in the clinic, to ascertain the effects of water sorption on retention. The following observations were made:

1. Increased water imbibition of the acrylic resin is reflected in increased retention. This was apparent in both the laboratory and the clinical aspects of the present work.
2. The imbibition of water, as evidenced by improvement in retention, appeared to continue with immersion during a period of time comparable to that observed by some previous investigators. The imbibition of water continued for a considerably longer time than that recorded by other investigators. None, however, were using retention of the denture as a measure of the imbibition of water.
3. To the extent of the rather limited comparisons possible in this work, it would seem that injection molded specimens do not differ significantly from their compression molded counterparts in regard to water sorption. This tends to bear out the conclusions reached by Skinner and Cooper and Grunewald, Paffenbarger and Dickson using other methods of determination.
4. From the viewpoint of retention, exact duplication of a denture appears to the author to be an impossibility.
5. As a supplement to the processes of weighing and physical measurements, an additional method of determining the effects of water imbibition on acrylic resin denture bases has been worked out on a practical basis.

Wanted: Trained Minds • A trained, and mind you I say trained, scientific researcher thinks only of the object he has before him, not of any ideology, not of himself, not of his publicity, not of what anybody thinks of him or his associates, not of another job—but only of one thing—what do the facts justify? How helpful it would be if we could have more trained minds to see errors, to pass judgment and guide action before it is too late. *Bernard M. Baruch.*

Methods of prevention and control of dental caries

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Approximately 90 per cent of the teeth now lost before middle age could be saved in the future adult population of this country by the application of what is already known about the control and prevention of dental diseases. A major problem is to find the means and the will for applying what is known. The public health dentist can play a major role in the solution of that problem.

Teeth are lost for two principal reasons: (1) destruction of the crowns by caries and (2) destruction of the attaching tissues by inflammation and degeneration. Although not all the intricate complications in the etiology of caries have been unraveled, sufficient understanding of the basic factors has been gained to place preventive treatment on a rational basis; and the possibility of controlling the progress of carious destruction through good operative dentistry at an early age is well established. The factor most often responsible for periodontal destruction is inflammation that can be traced to some local irritation. Early recognition of deviations from normal color, contour and texture of the gingiva, and institution of proper treatment to alleviate these symptoms, could result in tremendous reduction in the loss of teeth.

PRINCIPAL CAUSATIVE FACTORS

There are many predisposing conditions that may influence the carious process such as age, heredity, emotions, state of health, salivary flow and composition, tooth structure and position, but the actual destructive forces are few.[1] Evidence continues to accumulate to support the generally accepted theory that bacterial activity is a major factor. The fact that cavities invariably occur where microorganisms can accumulate and remain relatively undisturbed for long periods of time has provided circumstantial evidence that bacteria are associated with the destructive process. Direct evidence that bacteria are required for the production of caries is accumulating through the germfree animal studies conducted at the University of Notre Dame in collaboration with the Zoller Clinic of the University of Chicago.[2] Ordinary rats fed a caries-producing diet develop a high incidence of this disease. Germfree animals fed the same diet develop no carious lesions. Further evidence showing the importance of the local environment, including the bacterial flora, has been obtained by stomach tube feeding of rats.[3] When a caries-producing diet is placed in the stomach by this method, so that it does not come into contact with the teeth in passing through the mouth, no carious lesions develop.

The principal agent that destroys the calcified tissues of the teeth is probably acid in character. Many investigations[4] have demonstrated the production of

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1. Kesel, R. G. Dental caries: etiology, control and activity tests. J.A.D.A. 30:25 Jan. 1943.

2. Orland, F. J., and others. Use of the germfree animal technic in the study of experimental dental caries. I. Basic observations on rats reared free of all microorganisms. J. D. Res. 33:147 April 1954.

3. Kite, O. W.; Shaw, J. H., and Sognnaes, R. F. An influence on dental caries incidence produced in rats by tube feeding. (Abst.) J. D. Res. 29:668 Oct. 1950.

4. National Research Council. Survey of the literature of dental caries. Washington, D. C., National Academy of Sciences, 1952.

cavities in the enamel by weak acids. Recent experiments, under artificial conditions, have produced early lesions in the enamel that are indistinguishable from lesions that develop in the oral cavity.[5,6] The agents used to produce these lesions under laboratory conditions are acid. There is no instance in which anything resembling typical carious lesions has been produced artificially with nonacid substances. Several investigators have shown that when the tooth tissues are subjected to alkaline agents or proteolytic enzymes, no readily demonstrable effect appears.[7-9] If tooth tissues are exposed to a weak acid so that some decalcification takes place, then enzymes such as trypsin, pepsin or collagenase can exert a destructive action. Apparently, the carious process requires both acidic and enzymic components, and the natural carious process is probably one of intermittent periods of decalcification followed by lytic decomposition.

An association between acid production in the oral cavity and carious activity has been shown in numerous studies. Several investigators have found that if a caries-susceptible person rinses his mouth with a glucose solution, the potentiometer readings made with suitable electrodes to determine acid formation indicate that sufficient acid is formed on the tooth surface within a few minutes to be potentially harmful to the calcified tissues.[10-12] Individuals not susceptible to caries show no such acid production. Recent studies in which an indicator dye, methyl red, was used also showed acid conditions in carious regions.[13,14] This dye changes in color from yellow to red as acid is formed. When applied to the surfaces of the teeth after a sugar rinse, red coloration develops in the areas where the carious destruction appears to be taking place. This method is being studied currently in the hope of developing a simple caries-activity test that can be used in the dental office to demonstrate to the patient conditions in his own mouth. The long recognized association of acidogenic and aciduric bacteria with active caries is further circumstantial evidence of the importance of the acid factor.

The only type of food taken into the mouth which can develop an acidity of sufficient strength to dissolve enamel is carbohydrate. The carbohydrates are converted to acid by enzymatic action. The simpler the carbohydrate, the more rapidly is it converted to acid. Thus, the simple sugars—glucose, fructose, sucrose—are more readily converted than are the polysaccharides—the starches. Many dietary studies have shown an association between refined carbohydrate consumption and caries activity. It is well known that the amount of caries any population experiences is roughly proportional to its sugar consumption. It is important that experimental caries cannot be produced in laboratory animals unless the diet contains a readily fermentable fraction.

CONTROL OF CARIES

When these observations are collated—that is, the association between bacteria, carbohydrates, the production of acids

5. Weisberger, D. Role of glucose in production of artificial caries. J. D. Res. 29:14 Feb. 1950.

6. Dreizen, S., and Spies, T. D. Decalcification and discoloration of intact, non-carious human tooth crowns by an oral strain of Lactobacillus acidophilus. Oral Surg., Oral Med. & Oral Path. 4:388 March 1951.

7. Dannenberg, J. L., and Bibby, B. G. Effect of zinc chloride and potassium ferrocyanide on proteolysis. J. D. Res. 29:177 April 1950.

8. Engel, M. B. Softening and solution of the dentin in caries. J.A.D.A. 40:284 March 1950.

9. Frank, M. R. Etiology of dental caries. Decalcification by acids: can it be the original cause of dental caries? L'information-dent. 33:7, 1951.

10. Stephan, R. M. Intra-oral hydrogen-ion concentrations associated with dental caries activity. J. D. Res. 23:257 Aug. 1944.

11. Fosdick, L. S.; Campaigne, E. E., and Fancher, O. Rate of acid formation in carious areas. The etiology of dental caries. Illinois D. J. 10:85 March 1941.

12. Stralfors, Allan. Investigations into the bacterial chemistry of dental plaques. Stockholm, Tryckeri A.-B. Thule, 1950.

13. Hardwick, J. L., and Manley, E. B. Caries of the enamel. II. Acidogenic caries. Brit. D. J. 92:225 May 6, 1952.

14. Arnim, S. S., and Hardwick, J. L. Clinical demonstrations of acid production by mouth organisms using aqueous methyl red. North-West Den. 33:147 May 1954.

from bacterial action on carbohydrate and the requirement of acid for tooth destruction—it is obvious what the principal factors in tooth destruction are and what steps can be taken to prevent or control this disease. A rationale based on the factors outlined for reducing carious activity could include the following:

1. Restriction of the amount of fermentable carbohydrate in the diet.
2. Production of a tooth tissue more resistant to acid and enzymatic action.
3. Removal of fermentable material from the surfaces of the teeth before it is converted into acid.
4. Employment of nontoxic antibacterial agents to eliminate the microorganisms associated with the decay process or to interfere noticeably with their metabolism.
5. Placement of inhibitors in the mouth that interfere with or destroy the enzymes responsible for the conversion of carbohydrate to acid.
6. Neutralization of acids as rapidly as they are formed on the tooth surfaces.

The most effective means of preventing the initiation of carious lesions is a dietary program that sharply reduces the amount of sugar consumed. If refined sugar could be removed from the diet, the caries problem would be eliminated. In the United States in the neighborhood of 100 pounds of sugar per person per year is consumed. Twenty-five to 40 pounds of sugar per year would be sufficient to supply all the calories that are needed from a carbohydrate source for good nutrition.[15] The excess 60 to 75 pounds of sugar is detrimental for several reasons. It is producing a state of malnutrition, particularly among children, because it is a great appetite appeaser. It, like alcohol, contributes little to nutrition outside of caloric energy. Yet it is a common article of diet, particularly between meals, lessening the appetite for more nutritious material at mealtime. A report by a major candy manufacturer indicated that the annual consumption of candy for 1950 was 17 pounds per person.[16] The candy consumption was compared audaciously with that of butter, cheese and other products of high nutritional value. The article stated that the annual consumption of butter was ten pounds and of cheese seven pounds per person. The combined consumption of butter and cheese barely equaled that of candy. If the leaders of the candy industry of this country are proud of their accomplishment, they should look at Britain's record. The British cocoa, chocolate and confectionery alliances have reported that, since candy was derationed, Britons lead the world, consuming at the rate of 26 pounds per person annually. Such comparisons indicate the tremendous amount of material being eaten to satisfy appetite without providing good nutrition. Sugar consumption is producing obesity in some children and certainly in the adult population, as well as providing ammunition for the carious process in both. It may lead to vitamin B complex deficiency because of the need for this vitamin in the metabolization of useless calories. Much of the excess sugar is being taken in forms such as bottled beverages, chewing gum, pastries and jams that the population does not regard as sugar. Too many think of sugar only as the crystallin form in the sugar bowl. An evaluation of the sugar content of various items that are popularly consumed has been published in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.[17] Mimeographed copies of that list are available through some state health departments. They should be given to patients in whom caries control is being attempted. Nearly all will express amazement at the sugar content that is not

15. Massler, Maury, and Zwemer, J. D. Rampant caries. (Its clinical management.) Illinois D. J. 20:407 Sept. 1951.

16. Drug News, Sept. 1950, p. 23.

17. Brauer, J. C. Mastication the detergent, the adequate and the low-sugar diets; their effects on dental caries. J.A.D.A. 39:682 Dec. 1949.

apparent to the consumer; for instance, seven teaspoons of sugar in a candy bar; four to five teaspoons in a bottle of soft drink and 14 teaspoons of sugar in a piece of cherry pie.

Although management of caries through dietary channels may be difficult, an attempt certainly should be made to improve nutrition and to reduce caries by moderation in sugar consumption. Diet histories should be taken over a period of at least one week, and specific attention should be drawn to items in the diet that are high in sugar. It is not enough to request the reduction or removal of such items from the diet. Satisfactory substitutes should be emphasized. For in-between-meal snacks, nuts, popcorn, potato chips, cheese and other items that are appetite-appeasing but not readily fermentable, should be recommended. Sample menus should be provided for breakfast, lunch, dinner and in-between-meals; items to be avoided and those to be eaten should be listed. A sample of such menu recommendations has been provided by the Lederle Laboratories in one of its pamphlets on dental health.[18] Copies of it, with some modifications made by the author, have been found helpful in caries control work (table).

It must be recognized that there are strong economic and psychological disadvantages in attempting the control of caries by sugar restriction. Sugars are palatable, readily available, widely advertised and economical as a source of caloric energy. Individuals—even dentists—like their sweets, and that is one reason greater professional emphasis is not placed on this effective means of control. Some dentists hesitate to recommend vigorously what they themselves do not practice. This practical disadvantage necessitates consideration of other means for reducing caries activity.

Another effective means, with sufficient evidence to support the claims for it, is the use of fluorides either through water fluoridation or topical application of fluoride solutions. Any means for caries control that requires conscientious cooperation on the part of the individual, that denies him something which he enjoys or requires him to perform a ritual that is inconvenient, cannot be too effective in controlling caries in large numbers of people. But an agent that will give partial resistance and that can be provided without personal effort on the part of the individual is fluoridation of the drinking water. It should be an effective mass means of reducing caries. The disadvantage that may come from such an easy way is, perhaps, the implicit reliance on fluorine in the drinking water to give complete protection against caries. If water fluoridation develops a false sense of security that encourages increased sugar consumption and relaxed oral hygiene, perhaps more harm than good may result from water fluoridation, at least for some people. It should be emphasized always that fluorine is not a complete protector; that in communities where fluorides are present in optimal amounts in the drinking water, there is still much tooth decay. The same vigilance as to other measures for caries control is required, and periodic examination and restoration of the cavities that will develop are essential if water fluoridation is to obtain its maximum result.

For many years the toothbrush has been advocated as a weapon against caries. Skepticism has developed about its effectiveness because of the increasing incidence of caries despite the increased sale and use of toothbrushes and dentifrices. The reasons for this inconsistency are that the toothbrush has not been used at the time of greatest effectiveness nor in the manner that cleanses the areas that are vulnerable to decay. Present knowledge indicates that the de-

18. Lederle Laboratories. The dental care of children, 1953.

Table • Diet suggested for caries reduction

	Do eat	Do not eat
	Breakfast	
Bread (with butter)	Whole wheat, dark rye, Swedish, zwieback, Ry-krisp	White bread, doughnuts, Danish pastry, buns; or spreads such as jellies or jams
Cereals	Corn flakes, puffed rice, etc. with milk only	Sugar
Eggs	Any style; bacon, sausage, French toast with butter	Syrup
Fruits, juices	Whole fruit or fresh, frozen or unsweetened canned juice of orange, grapefruit; honeydew melon, cantaloupe	Prunes, apricots, figs
Milk	8 oz. (plain)	Chocolate or other flavored milk
Water	6 oz.	
	Lunch	
Soups, juices	Fresh or canned soups, vegetable juices	
Sandwiches	Lettuce, tomato, peanut butter, or cold cuts on bread products mentioned above, with butter	Jellies, honey, etc.
Salads	Tossed salads, hearts of lettuce, or salads of finely ground vegetables with dressing	
Desserts	Apples, oranges, tangerines; fresh pineapple	Cakes, cookies, bananas, plums, dates or dried fruits
Milk	8 oz. (plain)	
Water	6 oz.	Sweet carbonated drinks
	Dinner	
Soup or juice	Same choice as lunch	
Appetizers	Clams, oysters, shrimp, chicken liver, etc.	
Meats, fish	Beef, lamb, pork, veal, liver, fowl, or fish	
Vegetables	Fried rice or egg noodles, string beans, cooked carrots, potato chips, cabbage, spinach, cauliflower	
Salads	Same choice as lunch	
Desserts	Same choice as lunch	Ice cream, puddings, cakes, custards, pies, cookies
Milk	8 oz. (plain)	
Water	6 oz.	
	Between-meal snacks	
	Milk Bread and butter Corn chips Potato chips Popcorn Oranges Apples Carrots Hearts of lettuce or cabbage Celery Meat sandwiches	Candy Ice cream Chewing gum Raisins Jellies Sweetened drinks or other items mentioned

calcifying phase of the carious process reaches its maximum activity within the first 20 to 30 minutes after eating; therefore, the popular habit of brushing teeth the first thing in the morning and the last thing at night is not rational for caries control. People should be taught to clean the mouth soon after eating.

The way in which teeth are brushed is very important. Too often, particularly in children, the toothbrush comes into contact with only the prominent surfaces of the teeth—those areas that are naturally cleansed in mastication. Disclosing solutions should be applied to the teeth so that the individual can see where plaques of bacteria and debris accumulate in his own mouth; he is then better able to remove the plaques as a routine procedure. The plaque accumulation pattern varies with each individual. If he can see these plaques revealed by the dye, he can learn to care for his mouth much more efficiently.

Various dentifrices have been designed to inhibit bacterial or enzymatic activity, or to neutralize the acids that are formed after eating. Evidence is conflicting as to whether such additives in dentifrices are helpful in reducing caries activity. Investigations to determine the effectiveness of dentifrices for controlling caries are extremely hard to conduct, and results are difficult to interpret. Some of the obstacles are the necessity for a large number of subjects, the long time interval of study, the difficulty of obtaining conscientious cooperation or close supervision of the subjects, proper application of the material and adequate measurement of the effect of the brush alone. Then, too, the effectiveness of a dentifrice undoubtedly is mitigated by the cariogenic potency of many diets. It is reasonable to believe that a dentifrice with anticarious properties would be more effective in a total caries control program than when employed alone as the only controlling agent. Further investigation of dentifrices for caries control is necessary to measure their effectiveness conclusively.

It would be naïve to believe that in the foreseeable future the initiation of new carious lesions will be completely checked. For years ahead the preservation of many teeth from carious destruction will come only through good operative dentistry, started early and maintained at regular intervals. Better programs for the detection of early lesions in children, and their prompt elimination by proper fillings, will be most successful in reducing the number of dental cripples that now walk into dental offices.

The loss of permanent teeth in children and young adults is shocking. It is estimated that 40 per cent of children in the United States have had at least one permanent tooth extracted by the age of 14; that at age 35, a quarter to a half of the population has or should have artificial dentures.

In Figure 1, left, a beginning lesion can be seen in the occlusal surface of a lower molar in an 11 year old individual. Figure 1, right, shows the condition two years later. Evidently the neglected cavity had progressed to a point at which a dentist felt compelled to extract the molar. This subject was one of several hundred children under observation in a two year oral hygiene study.

Figure 2, left, shows the condition in another child in this study. Extensive caries can be seen beneath the occlusal enamel in both upper and lower first molars at age 11. Two years later (Fig. 2, right) both first molars were missing and the bicuspids were drifting. Figure 3 demonstrates the importance of the early detection and treatment of carious areas. Figure 3, left, shows an instance in which the central occlusal pits in the first molars were filled before the child was 14 years of age. Figure 3, right, shows no further carious destruction when the patient had reached age 17.

It may be enlightening to contrast oral

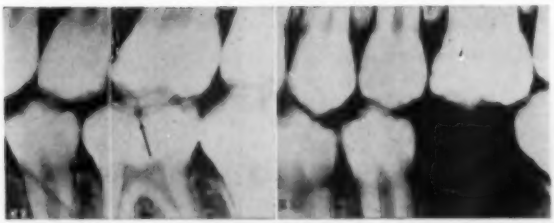

Fig. 1 • Left: Early occlusal caries in lower first molar in 11 year old child. Right: Same child, two years later. First molar is missing

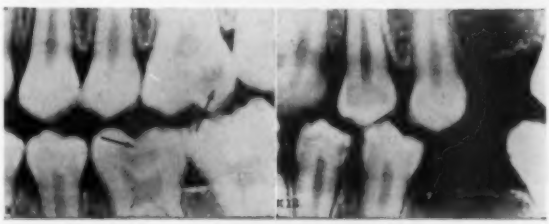

Fig. 2 • Left: Extensive caries undermining occlusal surfaces in upper and lower first molars of 11 year old child. Right: Same individual, two years later. First molars have been extracted and teeth are shifting

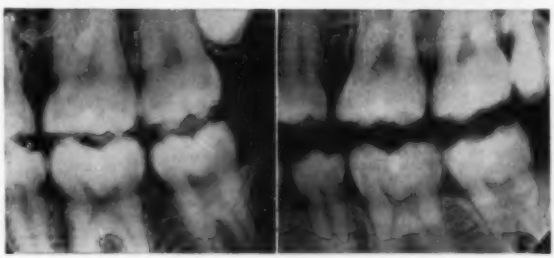

Fig. 3 • Left: Early caries in occlusal pits, properly treated. Right: Same teeth four years later. Caries checked

conditions in the school children of Norway with those in the United States. Since 1910 a school dental program has been conducted in Oslo, Norway, in which the children are provided annually with dental care. Upon graduation from high school, dental treatment is available only in private offices under circumstances similar to those in the United States.

A survey was made and reported by Carl Sebelius,[19] dental director of the Tennessee State Health Department, on the oral health of children residing in Oslo. There were 296 13 year old children in the group reported. When the results of his examinations are compared with those obtained from similar examinations of 370 13 year old children in Richmond, Ind., carried out under the direction of Waterman and Knutson of the United States Public Health Service, a considerable difference is noted[20] (Fig. 4). The rate of caries attack as indicated by decayed and filled teeth was reported to be approximately the same in Richmond as in Oslo—9.05 carious teeth per Oslo child to 8.87 carious teeth per Richmond child. This similarity in attack indicates that any dietary difference apparently had little effect on the incidence of caries.

In Oslo, the unfilled carious teeth, that is, the open, untreated lesions—averaged

19. Sebelius, C. L. Trends in preventive dentistry in the United States and Scandinavia. J. Am. Col. Den. 19:313 Sept. 1952.

20. Waterman, G. E., and Knutson, J. W. Studies on dental care services for school children. First and second treatment series, Richmond, Ind. Pub. Health Rep. 68:583 June 1953.

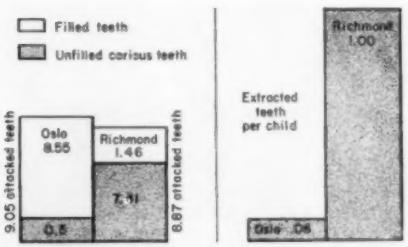

Fig. 4 • DMF comparison of Oslo, Norway, and Richmond, Ind., children, 13 years old

only 0.5 tooth per child as contrasted with approximately 7.5 teeth per Richmond child. Conversely, there was a considerable difference in the number of filled teeth—8.5 filled teeth in the average 13 year old Oslo youngster to only 1.5 filled teeth for the Richmond child of the same age; but the great significance comes in the comparison of extracted permanent teeth: in Oslo, the average was 6 teeth per 100 children whereas in Richmond the average was 100 teeth per 100 children, or one permanent tooth per child. If more effort is not put into remedial dental service for children, the United States will continue to reap in adults the results of disorganized child care.

COMMENT

Teeth are adult structures that erupt into the mouth long before the child is capable of appreciating their adult significance. Parents too frequently and for numerous reasons do not show the necessary concern. Therefore, dentists, who should more fully appreciate the value of sound teeth and a complete dentition than anyone else, should concentrate on planning better dental care programs for children. They should make the public more conscious of the ultimate value of such service and they should inaugurate, direct and participate in more such programs at community levels.

It is generally agreed that it is right and proper for every child to receive a certain amount of education. Laws require that during his crucial formative years each child must attend school until he is 16 years old. Health and appearance are as important to the child as is education. Should not dentists insist that programs be established that will utilize preventive skills in a remedial way and that will preserve for adult life great numbers of the teeth that are now being ruined during childhood? The greatest advance in dental public health can come from the widespread development of such programs.

Nothing new has been revealed in this brief review of caries etiology, prevention and control. Its purpose is to reaffirm faith in what is known and to accelerate more action in its application so that future generations will be served more by their own teeth and less by the artificial variety. Incidentally, this result would be the best long range solution to the problems concerning the dental technician and the illegal dental laboratory.

Nothing Is Impossible • **The steadily rising tide of technical knowledge has a way of obliterating obstacles so effectively that what seemed impossible to one generation becomes elementary to the next. *Arthur C. Clarke.***

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*
The Editor

SEMINARS IN HYPNOSIS

The American Society of Psychosomatic Dentistry wishes to notify the members of the American Dental Association that courses given as "seminars" in hypnosis as related to dentistry do not conform with the standards of our national organization. These "seminars" do not constitute a training course in hypnosis for use in dental practice, and the trainee is not prepared to make a proper appraisal of the use or application of hypnosis.

Training of large groups in this manner can only lead to loss of appreciation of a very valuable adjunct to the service rendered by the dentist. Such "seminars" are given usually without the approval of the district dental societies, and it is the opinion of this organization, which has a primary interest in the ethical control of hypnosis as applied in dentistry, that such approval should be secured in every case.

B. Edward Burgess, chairman, ethics and censorship committee, American Society of Psychosomatic Dentistry

FALSE ADVERTISING CLAIMS

During the last few years, I have been annoyed by commercial houses employing my name in their advertising literature. I have just received a leaflet advertising several products including one that gave me a jolt. It reads: "A New Root Canal Formula for Root Canal Therapy . . . Developed by Dr. Louis I. Grossman of the Pennsylvania School of Dentistry and called 'Radio-Opaque Cement.' This cement is used in the final process of filling a canal."

This announcement was news to me as I was totally unaware of having developed a new cement. I have not published a formula of a new cement since 1936. Although I have been working for some time past in an effort to develop an improved root canal cement, the clinical trials of promising *in vitro* specimens have not been entirely encouraging. In fact, if a new formula had been developed, it would have been published in the fourth edition of *Root Canal Therapy* which was issued recently.

It is hoped that dentists will not be misled by adroit insinuations or false claims which are all too often made in advertising literature and that they will depend on the American Dental Association Council on Dental Therapeutics' accepted preparations.

The writer does not recommend any commercial house which presumes to use his name in advertising circulars, whether the product be Therodent, PBSC, Extar or root canal cement.

Louis I. Grossman, Philadelphia

SUPPLIES FOR KOREA

One of the things that face the Korean dentists as a major problem is obtaining a continuing supply of dental materials. The Korean Dental Association has tried with some success the purchasing of materials through a cooperative organization. It took about six months for the supply purchased to arrive. Those who in the United States can get practically anything they want within a few minutes by calling a supply house have a difficult time imagining the situation here.

John McInnes, Seoul, Korea

CONTROLLED PREPARATION TECHNIC FOR PORCELAIN JACKET CROWNS

By William C. Ashkin, D.D.S., New York.

The pivotal point in the preparation of teeth for cast crowns and porcelain jackets is the interproximal areas. Well-defined finishing lines or shoulders in these hidden areas are the foundation of good preparations. When accurate interproximal shoulders are formed, the labial and lingual ends of these shoulders are guiding points for the ends of the labial and lingual shoulders, and thus a regular and continuous shoulder is created about the tooth. An accurate, controlled preparation technic for interproximal shoulders or finishing lines in the desired form and at the desired point has been developed.

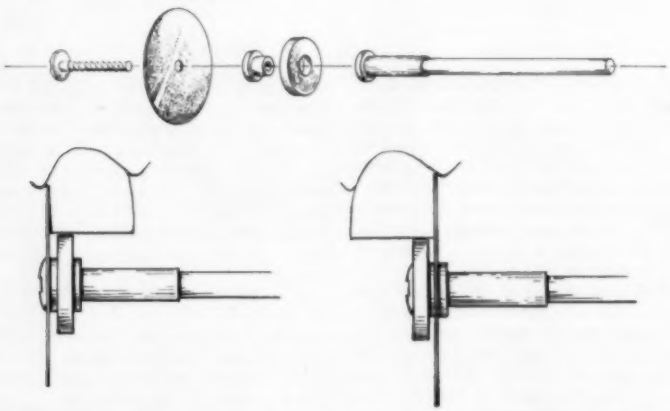

Fig. 1 • A control wheel consisting of a metallic wheel which rides on a bushing is placed on a mandrel together with an abrasive disk. The wide end of the bushing and the wheel always face the cutting surface of the disk. There is a set of five control wheels with diameters of ⅔ inch, ¾ inch, ⅘ inch, ⅝ inch and ⅞ inch diameters. Half of the difference between the diameter of the abrasive disk and the control wheel is the exposed cutting surface of the disk. For example, if a ⅞ inch disk and a ⅜ inch control wheel are used, the exposed cutting surface of the disk will be ⅜ inch. The size of the control wheel selected is that which, when placed on the mandrel together with the abrasive disk, will permit the exposed grinding surface of the disk to equal the distance between the occlusal or incisal surface and the point at which the shoulder or finishing line is desired.

Fig. 2 • Sufficient tooth structure is removed occlusally or incisally to allow for the thickness of the porcelain. A flat surface is created perpendicular to the long axis of the tooth. The labial and lingual corners of this surface are rounded.

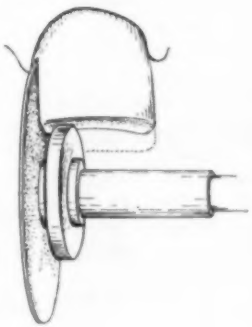

Fig. 3 • The interproximal surface is reduced until the control wheel rides on the prepared occlusal or incisal surface. With the control wheel resting on this surface and the mandrel held parallel to it, the abrasive disk is positioned against the interproximal surface. The control wheel is rolled labially, then lingually, with a slight pressure of the disk against the interproximal surface. The finishing line is at the point where the edge of the abrasive disk engages the neck of the tooth. For a shoulder preparation, this step is continued until the shoulder assumes the desired width. The labial and lingual corners of the flattened occlusal or incisal surface may be rounded to make an arc.

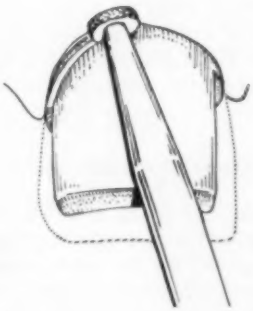

Fig. 4 • A no. 45 diamond point is used to join the interproximal shoulders labially with a groove hugging the gingiva. The depth of this groove is determined by the shaft of the diamond point. The patient should be positioned so that the lingual surface of the tooth is visible to the direct view. A groove also is made which joins the interproximal shoulders lingually.

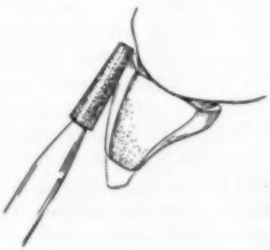

Fig. 5 • The labial surface is reduced by use of a tapering diamond stone which is held parallel to the long axis of the tooth. A diamond wheel is used to reduce the lingual surface. The incisal area is beveled so that it is parallel to the occluding surface of the occluding tooth.

Fig. 6 • The no. 45 diamond point is used to bring the labial shoulder just below the gingival margin. The corners are rounded and the labial incisal surface is tapered with a sandpaper disk to simulate the form of the original tooth. The shoulders are smoothed with a bur-shaped diamond point.

585 West End Avenue

COUNCIL ON DENTAL EDUCATION

Dental and dental hygiene students: their characteristics, finances and practice plans V. Living expenses

Expenditures reported by dental students to meet all items of living cost in the 1953-54 school year averaged $1,835 per student. The amounts reported, however, were distributed widely about this average.

VARIATIONS IN LIVING COSTS

One per cent of all students reported living costs which were less than $250 for the year. At the other extreme, a correspondingly small fraction reported amounts in excess of $5,000. The array of students by amounts reported (Fig. 20 and Table 25) is characterized by a median value of $1,653 ($Q_2$). One fourth of the students spent less than $1,153 ($Q_1$) and one fourth spent more than $2,368 ($Q_3$). In other words, the spread of values is represented by an interquartile range (Q_3 minus Q_1) that is more than $1,200. The tendency for high values to scatter widely establishes the average at a level which is $182 greater than the median.

School Differences • Among the 35 schools reporting data for all four classes of students, student living costs ranged from an average of $1,414 in the school with the lowest per student cost to $2,426 in the school with the highest per student cost. For the average school, however, the student cost was $1,845, an amount which closely approximates the $1,835 average for "all students." Generally, the averages for individual schools clustered about the value for the average school. In fact, for only eight schools, were they as much as 10 per cent in excess of this value, and, for only seven schools, were they as much as 10 per cent under this value. For the remaining 20 schools the divergence was less than 10 per cent.

The level of living, as reflected by median values, paralleled closely the pattern reflected by average living costs. Within individual schools, however, living costs varied about as widely around the average for the schools, as was true in the case of "all students" averages. The interquartile range (Q_3 minus Q_1) was seldom less than $900 or greater than $1,300.

Expenditures for Different Living Cost Items • The cost of food stands out as the item contributing most heavily to student living costs. Practically all students reported some expense for this

This is Chapter 5 of a report of a cooperative study made by the Council on Dental Education of the American Dental Association and the Division of Dental Resources of the United States Public Health Service.

Text of this report was prepared by Walter J. Pelton, D.D.S., M.S.P.H.; Quentin M. Smith, D.D.S.; Elliott H. Pennell; Ruth D. Bothwell, and James N. Ake, Washington, D. C.

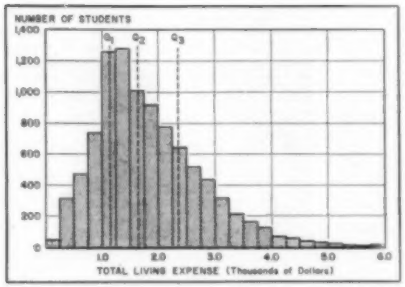

Fig. 20 • Distribution of dental students, by total living costs: 1953-1954

item, and the amount most frequently reported was between $600 and $699 (Fig. 21 and Table 26). Of the $1,835 spent by the average dental student to meet living expenses during the school year, $563, or nearly one third went for food costs (Fig. 22). Expenditures for shelter, including rentals paid for rooms or apartments, averaged $380 or about one fifth of the total. The amount most frequently reported was between $200 and $299 but some students reported expenditures for this item which were in excess of $1,000. Practically all students reported expenses for personal maintenance and for recreation. For both of these items, the amount most frequently reported was between $100 and $199. Personal maintenance, including clothing, laundry, tobacco, and so on, amounted to $254 for the average student while $200 was spent for recreation. Travel costs were $157, with slightly more than one half devoted to daily travel and the balance to travel between school and home town, vacation travel, and so forth. The relatively low average amounts reported for daily and for other travel not only reflect small expenditures by the majority of students but also the fact that large numbers of students reported no travel expense at all. Expenditures for health and medical care averaged only $62 for the year. Like the two travel cost items, expenditures for health, when reported, were generally less than $100, and many students reported no costs for the year. Finally, the diverse assembly of items, such as household furnishings, car expense, insurance, and taxes, which were grouped under "other," added to $219. Although many students reported no "other" costs, the substantial amounts reported by some students brought the average for this item to more than 10 per cent of all living costs.

Differences Associated with Year in School • Throughout the four years in school, the average expenditures to meet living costs progressively increased. This increase represents the combined result of

Table 25 • Distribution of dental students by living costs for the school year 1953-54

Total expenditures	Students reporting specified amounts	
	Number	Per cent
All amounts	9,521	100.0
None	34	0.4
Under $250	52	0.6
250-499	314	3.3
500-749	472	5.0
750-999	738	7.8
1,000-1,249	1,255	13.2
1,250-1,499	1,279	13.4
1,500-1,749	1,008	10.6
1,750-1,999	913	9.6
2,000-2,249	774	8.1
2,250-2,499	641	6.7
2,500-2,749	515	5.4
2,750-2,999	435	4.6
3,000-3,249	315	3.3
3,250-3,499	210	2.2
3,500-3,749	162	1.7
3,750-3,999	128	1.3
4,000-4,249	71	0.7
4,250-4,499	59	0.6
4,500-4,749	38	0.4
4,750-4,999	30	0.3
5,000-5,249	21	0.2
5,250-5,499	13	0.1
5,500-5,749	9	0.1
5,750-5,999	12	0.1
6,000 and over	23	0.3
Summary values		
Arithmetic average	$1,835	
1st Quartile (Q_1)	1,153	
Median (Q_2)	1,653	
3rd Quartile (Q_3)	2,368	

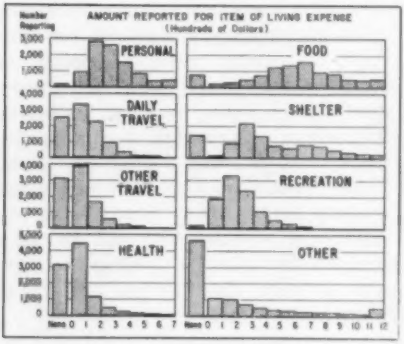

Fig. 21 • Distribution of dental students, by the designated categories of living costs: 1953-1954

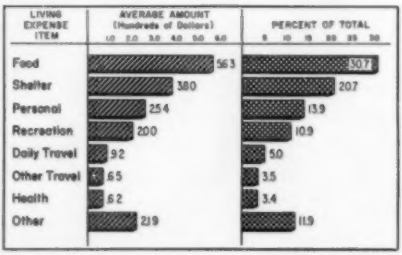

Fig. 22 • Amount and proportion of average total living cost used for different expenditure items: 1953-1954

gradually expanded expenditures by both married and single students from one school year to the next and the progressively larger proportion of married students in each succeeding class in school. This year-by-year increase in living costs characterizes all sub-items reported to some degree (Fig. 23 and Table 27). It is of interest to note, however, that the apportionment of expenditures among the several sub-items of living expense did not materially change. The percentage of living costs assigned to food, personal items, recreation and travel declined slightly between the freshman and the senior year, while slightly larger shares of the total were reflected in expenditures for shelter, health and "other" items. The largest declines were from 32.1 to 30.1 per cent for food and from 11.4 to 9.7 per cent for recreation. Similarly the greatest increases were the changes from 2.7 to 3.8 per cent for health and from 10.4 to 13.4 per cent for items reported as "other" expense.

Table 26 • Distribution of dental students by amounts spent for selected items of living for the school year 1953-54

Amount spent	Number of students reporting designated amounts for selected items of living							
	Food	Shelter	Personal	Recreation	Travel		Health	Other
					Daily	Other		
None	723	1,434	111	132	2,510	3,110	3,129	4,693
Under $100	175	50	947	1,879	3,303	3,945	4,416	1,013
100-199	284	872	2,804	3,275	2,252	1,660	1,117	1,006
200-299	458	2,161	2,605	2,365	969	541	455	673
300-399	717	1,307	1,527	1,006	328	156	201	445
400-499	1,209	702	800	476	84	60	87	303
500-599	1,350	591	356	218	33	22	54	269
600-699	1,554	734	169	89	24	9	21	187
700-799	918	665	102	39	11	3	13	173
800-899	789	425	42	23	4	6	7	142
900-999	444	272	22	7	2	4	2	105
1,000-1,999	436	160	13	11	1	4	7	101
2,000 and over	464	148	23	1	—	1	12	411
Average	$563	$380	$254	$200	$92	$65	$62	$219

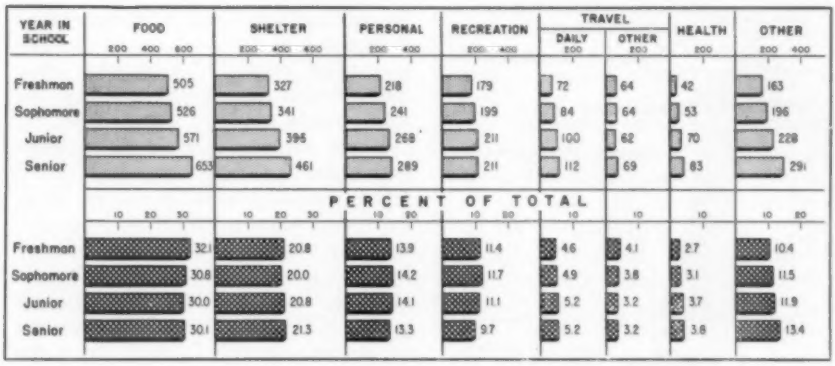

Fig. 23 • Amount and proportion of average total living cost used for different expenditure items by year in school: 1953-1954

Differences Associated with Marital Status • The substantial differences in living costs which are associated with differences in marital status and living arrangements of students are graphically portrayed in Figure 24 and Table 28. In this presentation, distributions by living cost are shown for four categories of students; that is, single—at home, single—away from home, married—without children and married—with children. As would be anticipated from averages presented in earlier discussions, there is a sharp demarcation of patterns between the values reported by the two categories of single students and for married students as a group. The presence or absence of dependent children in the home, however, does not materially alter the pattern of total living costs reported by married students. The scatter of living costs is much less for single than for married students. As measured by the interquartile range (Q_3 minus Q_1), the value is \$677 for single students living at home and \$602 for those away from home. For married students, on the other hand, the spread of values is much greater. The

Table 27 • Amount and proportion of average living expenses of dental students, for the school year 1953-54

Year in school	Number of students	Item of living expense								
		Total	Food	Shelter	Personal	Recreation	Travel		Health	Other
							Daily	Other		
		Amount								
Freshman	2,371	$1,570	$ 505	$ 327	$ 218	$ 179	$ 72	$ 64	$ 42	$163
Sophomore	2,393	1,704	526	341	241	199	84	64	53	196
Junior	2,470	1,906	571	396	268	211	100	62	70	228
Senior	2,287	2,169	653	461	289	211	112	69	83	291
4 year total	9,521	7,349	2,255	1,525	1,016	800	368	259	248	878
		Per cent								
Freshman	2,371	100.0	32.1	20.8	13.9	11.4	4.6	4.1	2.7	10.4
Sophomore	2,393	100.0	30.8	20.0	14.2	11.7	4.9	3.8	3.1	11.5
Junior	2,470	100.0	30.0	20.8	14.1	11.1	5.2	3.2	3.7	11.9
Senior	2,287	100.0	30.1	21.3	13.3	9.7	5.2	3.2	3.8	13.4
4 year total	9,521	100.0	30.6	20.8	13.8	10.9	5.0	3.5	3.4	12.0

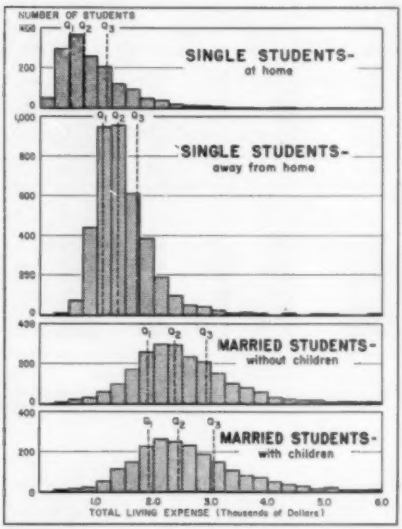

Fig. 24 • Distribution of dental students in selected categories, by total living cost: 1953-1954

range (Q_3 minus Q_1) was $1,031 for households without children and $1,126 for families with children.

The substantial differences in living costs which are associated with differences in marital status and living arrangements of students are reflected in varying degrees by most of the items reported (Fig. 25 and Table 29). In the comparison, values are presented as four year estimates. Single students, living away from home in dormitories, rooming houses, clubs or apartments spent an average of $5,913 over the four years they were in school. Of this amount, $2,115 or nearly 36 per cent was used for the purchase of food, and $1,063, or about one fifth was spent for a place to live. Nearly $900 was spent for personal maintenance, and recreational activities represented expenditures of a like amount. Only $77 was spent by the average student in this category to cover the cost of health and medical care. Slightly less than $500 went for travel, of which only $179 represented daily travel, and the remainder, vacation and other travel. Miscellaneous other items totaled less than $400 during the four years in school.

Single students who lived at home with parents while attending dental school realized substantial savings. Their total expenditures ($3,598) were less than two thirds as great as those reported by other single students, and their payments for food were only one third as great ($724). Similarly, their payments for shelter were only $238, or about one fourth those by other single students. Savings on other items of living expense, though frequent, were not substantial. Personal maintenance costs were reduced from $896 to $767. Expenditures for recreation, on the other hand, were about the same for both groups of single students ($890 and $899). Single students at home paid more for health and medical care, but for both groups this item was small. Daily travel of students living with parents was much greater than by other single students ($451 compared with $179) while other travel, as might be anticipated, was much less ($78 as compared with $310). Items listed under "other" expense differed by only $45.

Married students, with their high average living costs, reported expenditures which followed a different pattern. Although expenditure data have been presented separately for married students without children and for those with children, the total living costs were not found to be substantially different for the two groups. Married students with dependent children spent only $444 more, on the average, than did those with no children ($10,270, as compared with $9,826). This small difference in four year costs was distributed over a variety of items. Personal maintenance and travel costs were essentially the same for both types of households. Where there were children, additional amounts of

$622 and $279, respectively, were added to food costs and to health and medical care expense. In partial compensation, expenditures for shelter, for recreation and for "other" expenses were from $125 to $150 less.

The relatively high living costs of married students in both categories, as compared with single students living away from home, is reflected in added expenditures for only part of the expense items reported. Food costs were about one fourth greater in homes without children and one half greater for students with children. Payments for rent or other expenditures for living accommodations were nearly two and one half times as great for both groups of married students, while expenditures listed as "other" expense were about four times as great. This latter circumstance reflects the relatively high frequency of purchases associated with furnishing and maintaining a home. Most striking of all differences was the high medical expense reported by married students. This item was more than $300 for married students without children and was nearly $600 in households with children, amounts which were from 4 to 8 times as great as those reported by single students living away from home. Daily travel costs reported

Table 28 • Distribution of dental students by total living expense for the school year 1953-54

	Students in designated categories reporting designated amounts			
	Single students		Married students	
	at home	away from home	without children	with children
All amounts	1,531	3,825	2,144	2,021
None	30	3	1	—
Under $250	49	1	1	1
250-499	299	4	6	5
500-749	370	72	19	11
750-999	254	438	28	18
1,000-1,249	203	947	58	47
1,250-1,499	120	954	94	111
1,500-1,749	91	607	167	143
1,750-1,999	46	383	260	224
2,000-2,249	32	185	295	262
2,250-2,499	13	91	292	245
2,500-2,749	11	44	232	228
2,750-2,999	7	38	207	183
3,000-3,249	2	20	147	146
3,250-3,499	1	6	100	103
3,500-3,749	1	9	76	76
3,750-3,999		5	55	68
4,000-4,249	1	1	26	43
4,250-4,499	1	6	20	32
4,500-4,749		1	16	21
4,750-4,999		3	16	11
5,000-5,249		2	4	15
5,250-5,499		2	6	5
5,500-5,749			4	5
5,750-5,999			6	6
6,000 and over		3	8	12
	Summary values			
Arithmetic average	$ 890	$1,454	$2,478	$2,589
1st Quartile (Q_1)	503	1,116	1,906	1,939
Median (Q_2)	767	1,367	2,372	2,442
3rd Quartile (Q_3)	1,180	1,718	2,937	3,065

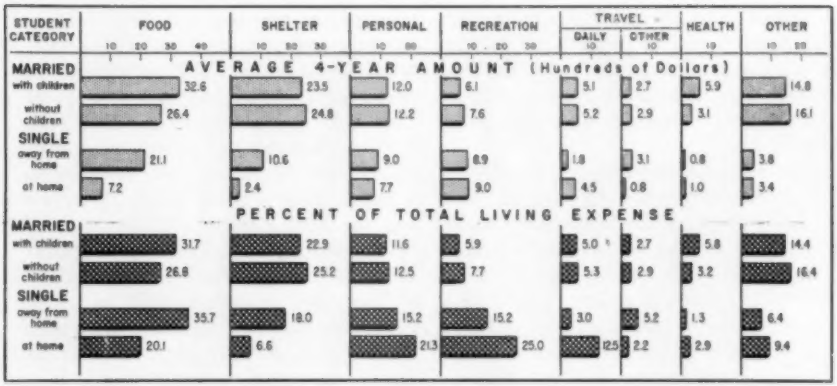
STUDENT CATEGORY
FOOD
SHELTER
PERSONAL
RECREATION
TRAVEL
DAILY
OTHER
HEALTH
OTHER
AVERAGE 4-YEAR AMOUNT (Hundreds of Dollars)
MARRIED
with children 32.6 23.5 12.0 6.1 5.1 2.7 5.9 14.8
without children 26.4 24.8 12.2 7.6 5.2 2.9 3.1 16.1
SINGLE
away from home 21.1 10.6 9.0 8.9 1.8 3.1 0.8 3.8
at home 7.2 2.4 7.7 9.0 4.5 0.8 1.0 3.4
PERCENT OF TOTAL LIVING EXPENSE
MARRIED
with children 31.7 22.9 11.6 5.9 5.0 2.7 5.8 14.4
without children 26.8 25.2 12.5 7.7 5.3 2.9 3.2 16.4
SINGLE
away from home 35.7 18.0 15.2 15.2 3.0 5.2 1.3 6.4
at home 20.1 6.6 21.3 25.0 12.5 2.2 2.9 9.4

Fig. 25 • Amount and proportion of four year living cost used for different expenditure items by selected categories of students: 1953-1954

by both groups of married students exceeded the amount spent by either group of single students, and amounts for other travel were also relatively high. The only item for which married students spent less was for recreation. In this area, expenditures were $281 or $132 under those of single students according to whether or not children were present in the home.

School Differences in Expenditures by Single and Married Students • In general, schools in which living costs were highest had larger proportions of married students in attendance than did the low-cost schools. Among the eight schools whose average per-student costs were 10 per cent or more greater than the "all student" average, 55 per cent of the

Table 29 • Amount and proportion of average four year living expenses reported by selected categories of students: 1953-54

Category of students	Number of students	Item of living expense								
		Total	Food	Shelter	Personal	Recreation	Travel		Health	Other
							Daily	Other		
		Amount								
Married students—										
with children	2,021	$10,270	$3,259	$2,354	$1,195	$609	$510	$275	$592	$1,476
without children	2,144	9,826	2,637	2,479	1,225	758	520	287	313	1,607
Single students—										
away from home	3,825	5,913	2,115	1,063	896	890	179	310	77	383
at home	1,531	3,598	724	238	767	899	451	78	103	338
		Per cent								
Married students—										
with children	2,021	100.0	31.7	22.9	11.6	5.9	5.0	2.7	5.8	14.4
without children	2,144	100.0	26.8	25.2	12.5	7.7	5.3	2.9	3.2	16.4
Single students—										
away from home	3,825	100.0	35.7	18.0	15.2	15.2	3.0	5.2	1.3	6.4
at home	1,531	100.0	20.1	6.6	21.3	25.0	12.5	2.2	2.9	9.4

students were married. At the other extreme, less than one third of the students in attendance in the seven schools with the lowest average living costs were married. For the 20 intermediate schools, for which average living costs deviated less than 10 per cent from the "all student" average, the proportion of married students was 43 per cent. Nonetheless, only part of the difference between high-and-low cost schools was attributable to differences in marital status composition. Living costs for both married students and for single students living away from home, for example, were greatest in the eight high-cost schools, intermediate in value for the 20 schools in the intermediate cost group and lowest for the seven schools with lowest average living costs.

The differences between averages for single students living away from home and for married students were much less pronounced from school to school than were the "all student" averages. Although average amounts spent for different items varied, the distribution of living expenses as reported by most schools followed very similar patterns. There were a few extreme values in each comparison, but the average amounts for individual schools clustered closely about the average for the median school. For example, the school average per-student food and personal maintenance costs for more than two thirds of all schools were within 10 per cent of the value which characterized the median school. Similarly, amounts spent for shelter and recreation although somewhat more divergent, were so clustered that more than one half of the schools reported values within 10 per cent of that for the median school. Expenditures for health, daily and other travel and "other" expense items varied more widely from school to school. In fact, values for only about one third of the schools fell within 10 per cent of the value for the median school. It should be recalled, however, that the per student amounts for these items represent relatively small fractions of total living costs.

Differences Between Public and Private Schools • For single students living away from home, expenditures to meet the four year cost of living were $483 less in public than for those in private schools (Table 30). The relatively small magnitude of this difference is appreciated when it is noted that this represents only the difference between $6,060 and $5,577 for four years in school. The savings were

Table 30 • Average four year living expenses reported by selected categories of students, by type of school: 1953-54

Category of student and type of school	Number of students	Item of living expense								
		Total	Food	Shelter	Personal	Recreation	Travel		Health	Other
							Daily	Other		
Married students—										
Private	2,771	$10,162	$2,974	$2,446	$1,217	$696	$532	$290	$463	$1,544
Public	1,394	9,798	2,861	2,362	1,197	670	483	262	417	1,546
Single students— away from home										
Private	2,680	6,060	2,143	1,120	900	917	183	334	80	383
Public	1,145	5,577	2,056	931	886	826	170	255	66	387
Single students— at home										
Private	1,326	3,564	698	231	756	899	462	78	105	336
Public	205	3,815	896	279	846	890	380	80	83	361

Table 31 • Average four year living expenses reported by selected categories of students, by veteran status: 1953-54

Category of student and veteran status	Number of students	Item of living expense								
		Total	Food	Shelter	Personal	Recreation	Travel		Health	Other
							Daily	Other		
Married students—										
Veteran	2,508	$10,469	$3,125	$2,428	$1,250	$673	$531	$285	$486	$1,691
Nonveteran	1,657	9,449	2,662	2,414	1,154	708	494	271	393	1,353
Single students— away from home										
Veteran	799	6,131	2,170	1,108	887	858	195	317	87	509
Nonveteran	3,026	5,845	2,100	1,048	895	905	173	307	73	344
Single students— at home										
Veteran	257	4,127	837	350	777	929	517	87	104	526
Nonveteran	1,274	3,495	697	215	765	893	439	79	101	306

distributed over a variety of sub-items but were reflected, for the most part, in reductions of $189 in rental costs, $87 in food, $92 in travel and an equal amount in recreational expense. The excess in average total costs reported in private schools was somewhat less for married students ($364), but the differences were apparent in essentially the same items. On the other hand, somewhat higher costs are reported by public school students living with parents than by those in private schools ($251).

The relatively small contribution of any single sub-item to differences in total living cost in the two types of schools is evident from the fact that divergence between costs reported are in excess of $100 in only three instances, two of which concern expenditures for food. Married students in public schools spent $2,861 for food, or $113 less than the $2,974 food costs reported by those in private schools. Among single students living with parents, on the other hand, students in public schools reported slightly higher expenditures for food than those in private schools ($896, as compared with $698). The third and greatest difference was found in rental costs for single students living away from home. In their case, private school students spent $1,120 for living accommodations as compared with $931 for those in public schools.

Differences Between Veterans and Nonveterans • The average married veteran spent approximately $1,000 more for living costs than did the married nonveteran (Table 31). Veterans in each group of single students also spent more than did nonveterans, the difference between the averages being $286 for those living away from home and $632 for those at home with parents. Except for recreation costs, all types of expenditures by veterans in each of the three student groups equaled or exceeded those by nonveterans. In the case of recreation costs, however, expenditures by married veterans were only $673, as contrasted with $708 by nonveterans. Single veterans living away from home also reported slightly smaller expenditures in this category ($858, as compared with $905). Single veterans living with parents, on the other hand, spent $929 for recreation as contrasted with $893 by nonveterans.

Regional Differences • The living costs reported by students varied somewhat from one geographic region to another. For both single students living away from

Table 32 • Average four year living expenses reported by dental students, by region: 1953-54

Geographic location of school	Number of students	Item of living expense								
		Total	Food	Shelter	Personal	Recreation	Travel		Health	Other
							Daily	Other		
Married students—										
Northeast	715	$ 9,422	$2,815	$2,222	$1,208	$723	$447	$242	$400	$1,365
North Central	1,482	10,063	2,915	2,501	1,150	663	533	304	416	1,581
South	1,422	10,103	2,925	2,389	1,318	718	491	288	434	1,540
West	546	10,626	3,204	2,524	1,113	640	620	259	622	1,644
Single students— away from home										
Northeast	938	5,817	2,079	1,123	877	909	115	285	90	339
North Central	1,398	5,934	2,173	1,070	843	886	171	331	71	389
South	1,266	5,915	2,110	988	975	883	205	299	67	388
West	223	6,203	1,935	1,206	848	899	348	339	102	526
Single students— at home										
Northeast	618	3,209	634	142	736	863	429	59	108	238
North Central	528	3,807	684	276	759	965	493	89	96	445
South	248	4,146	1,080	369	928	915	382	82	70	320
West	137	3,738	633	303	703	775	549	114	171	490

home and for married students, the lowest average was reported from the Northeast and the highest from the West (Table 32). For single students at home, the highest average was reported from the South and the lowest from the Northeast. The direction of regional differences for the various sub-items of expense often failed to parallel that for total living expense. Costs of rent, travel and "other expense" followed the pattern of total expense for each category of student. The pattern of expenditures for the other items reported failed to reveal any consistency. In other words, there were differences among the several items which were large in magnitude, but the highest or lowest costs were not associated with any specific geographic region.

CONCLUSION

The level of living costs is largely determined by the marital status and living arrangements which characterize a student's attendance at school. As measured by average reported expenditures, living costs for four years in school were lowest for single students living at home ($3,598) and highest for married students ($10,042), with single students living away from home reporting intermediate expenditures ($5,913). The presence of dependent children in the homes of married students only slightly increased the average amount reported.

Expenditures of dental students in each of these categories, however, were distributed over a wide range of values. Furthermore, the level of costs was different from school to school, presumably as a result of differences in the cost of available living accommodations and commodities in the locale of the school. On the other hand, the amount spent for living by any individual student is further influenced—and often to an important degree—by the financial resources available to him and the choice of accommodations and living arrangements which he finds that are suitable to his needs.

COUNCIL ON LEGISLATION

Association witness testifies on H.R. 7225, the O.A.S.I. amendments

On February 8th, Paul E. Jones, chairman of the Council on Legislation, appeared before the Senate Committee on Finance to support the Association's policy of voluntary coverage for self-employed dentists under O.A.S.I. Dr. Jones also voiced the Association's disapproval of a provision within H.R. 7225 that would require persons receiving the disability benefits proposed by the bill to participate in state vocational rehabilitation programs to preserve their entitlement to the disability benefits. The text of Dr. Jones statement to the Senate Finance Committee follows.

I am Paul E. Jones of Farmville, N. C. I am engaged in the private practice of dentistry in that community. I am a member of the North Carolina delegation to the American Dental Association's House of Delegates and chairman of the Association's Council on Legislation. I am here today to present our position on two features of H.R. 7225: first, the proposal to include self-employed dentists under the Old Age and Survivors' Insurance plan; second, the proposed system for integrating the new disability benefits with the State Vocational Rehabilitation Program.

INCLUSION OF SELF-EMPLOYED DENTISTS WITHIN O.A.S.I.

The Social Security Act (Sections 211(c)(5) and 1402(c)(5)) now excludes the services performed by self-employed dentists from the occupations covered under the O.A.S.I. program. H.R. 7225 (Sections 104(d) and 201(f)) would remove that exclusion and bring the services of self-employed dentists within the program on a mandatory basis. The House of Delegates of the American Dental Association, at its 1955 annual meeting, rescinded the Association's policy opposing the inclusion of self-employed dentists within the O.A.S.I. program and established a new policy supporting their inclusion on an elective basis. That policy declares:

Resolved, that the voluntary inclusion of dentists under the Old Age and Survivors' Insurance Program of the federal Social Security Act be approved.

The system for covering self-employed dentists on a mandatory basis, as proposed by H.R. 7225, is, therefore, contrary to the policy of the American Dental Association. We believe that coverage on an elective basis is not only feasible but is also the most equitable and suitable method for applying the program to self-employed dentists. Before presenting the Association's reasons in support of its policy, however, I believe it would be desirable to explain briefly some important features in the establishment of that policy.

The Association's House of Delegates is composed of 416 dentists, representing 54 constituent societies and the federal dental services. Each of the member state and territorial societies selects its own delegates, a society's representation in the House being proportional to its active membership. The authority for establishing Association policy rests with the House of Delegates. Our Board of Trustees may establish policy between annual meetings of the House only under emergency conditions. As a policy-making body, the Association's House of Delegates represents more than 80 per cent of the nation's practicing dentists.

The 1955 House of Delegates, by a vote of 266 to 143, rescinded its 1949 pronouncement against O.A.S.I. coverage for self-employed dentists. By a vote of 245 to 163, the House adopted a resolution approving voluntary coverage. Both votes were taken by roll call of the separate delegations. The resolution supporting voluntary coverage was unanimously approved by 35 of the 54 delegations voting on the question; a majority in each of four other delegations also approved the resolution. Thus, 72 per cent of the delegations which voted approved voluntary coverage of self-employed dentists under the O.A.S.I. program.

The position taken by the Association's House of Delegates fully considers the viewpoints of those dentists who desire to be included in the O.A.S.I. program and those who do not. That policy is in keeping with the

decisions of responsible representative bodies on matters which can be resolved by an effective compromise.

The Association's House of Delegates, moreover, has never treated the O.A.S.I. issue in isolation. The members of the House must consider the impact of any issue before them upon other goals which the Association strives to attain. As leaders of a profession providing vital health services to the public, the members of the House, I am certain, considered what effect an inducement to retire at age 65 might have on the availability of dental services to our sharply increasing population. The members of the House also realized that if dentistry sought O.A.S.I. coverage for its self-employed members on a mandatory basis, that decision would bind not only all dentists practicing today but also those entering the profession in the future. The decision of the House, moreover, reflects the conviction that elective coverage for self-employed dentists can be adapted to the existing O.A.S.I. program.

The Social Security Act, today, enables members of the clergy, not bound by the oath of poverty, to choose whether or not they wish to be included within the O.A.S.I. program. There is, therefore, already a statutory method for covering individuals on an elective basis. That system has evidently been administered satisfactorily; the Association has not been informed of any unfavorable effects from the elective system either on the administration of the program or on those covered on a mandatory basis. It has been argued that elective coverage would bring within the program a disproportionate number of "bad risks," and that the "good risks" would choose to remain outside the program. That result, if it occurred, would be only temporary. Long-range, those permitted to elect coverage would have to make their decisions within two years after entering an occupation to which the elective system applied. The individual, at the start of his career, would have no way of predicting with any degree of certainty his potential gain or loss from participation in the O.A.S.I. program.

There are, in the Association's opinion, some positive economic factors to justify including self-employed dentists under O.A.S.I. on an elective basis. The self-employed person who is covered under the program throughout his career ordinarily will contribute much more to the O.A.S.I. trust fund from his own income than will an employee with the same years of coverage. For self-employed persons, then, the return on contributions may not appear to be as favorable as it would to an employed person. For the self-employed dentist who does not contemplate retirement at age 65, an investment which could be used to supplement income during later years might be more suitable than O.A.S.I. benefits.

The typical young dentist, today, enters practice at age 26 or 27. If he contributes to the O.A.S.I. trust fund (at the present schedule of rates) from 1955 until he reaches age 65, he will have paid into the fund about $8,500, assuming his net income from practice would be at least $4,200 a year. If he retired at age 65, his return from the fund would conceivably be greater than his contributions. Experience indicates, however, that the majority of self-employed dentists do not retire; most of them carry on at least a partial practice through their advanced years. The Association's Bureau of Economic Research and Statistics in its "1953 Survey of Dental Practice" disclosed that the average annual net income of self-employed dentists between the ages of 65 and 69 years was $7,192 for 1952; for the same year the average annual net income of those between the ages of 70 and 74 was $5,842. That income expectancy would certainly deter many self-employed dentists from giving up or curtailing their practices in order to collect O.A.S.I. retirement benefits.

The demand for dental health care, particularly in the areas away from metropolitan communities, has increased considerably in recent years. Dentists who practice in the less densely populated communities, particularly in rural areas, may taper off in their later years, but they seldom retire from practice. The typical small community or rural dentist serves his patients as long as he is able to continue in practice. For many dentists in the smaller communities and rural areas, participation in the O.A.S.I. program would have little attraction. The Association believes that Congress should recognize that the O.A.S.I. program may not be economically adaptable to the conditions of practice and the career plans of a substantial number of self-employed dentists. We urge this Committee to approve an amendment to H.R. 7225 that would apply the present statutory system of elective coverage to self-employed dentists. In an appendix to this statement we suggest an appropriate amendment. The language is similar to that of S. 3109 introduced by Senator Carlson of Kansas, a member of this Committee.

The Association also urges this Committee to approve amendments to H.R. 7225 which will provide to those within the newly covered groups nearing age 65 or beyond that age a fair opportunity to acquire fully insured status and to qualify for maximum benefits. That was done for the groups newly covered in 1950 and 1954. Under H.R. 7225, for example, all persons within the groups proposed to be covered

initially in 1955 would have to acquire at least 20 quarters (five years) of coverage to be eligible for maximum benefits. That would produce a significant hardship on those who are nearing age 65 or who are beyond that age. The Association has included in its appendix to this statement an amendment to section 104(d) of H.R. 7225 to correct these inequities.

DISABILITY BENEFITS AND STATE REHABILITATION PROGRAM

H.R. 7225 would incorporate within the O.A.S.I. program a new type of benefit. That benefit would be paid to children receiving dependent benefits who because of permanent and total disability remain dependent after their eighteenth year. They would be entitled to those benefits as long as they remain disabled. A disability benefit would also be paid to certain currently and fully insured persons who are at least 50 years of age and who have not reached their 65th year. Among the conditions to be met by an individual in either group would be proof that he or she is unable to engage in any substantial gainful activity because of a medically determinable physical or mental impairment which can be expected to result in death or to be of long-continued and indefinite duration. The American Dental Association has taken no position on that part of the plan which offers monthly O.A.S.I. benefits to the totally and permanently disabled. The Association does, however, object to the provisions within H.R. 7225 (Section 103(b)) which would require the disabled beneficiaries to participate in a state vocational rehabilitation program to preserve their entitlement to benefits.

H.R. 7225 places within the discretion of the Secretary of the Department of Health, Education and Welfare the right to suspend in whole or in part the benefits of any individual who refuses, without good cause, to undertake a program of rehabilitation under state auspices. This sanction would undoubtedly compel a substantial number of totally and permanently disabled individuals to enter a program which has an entirely different objective from that of establishing O.A.S.I. benefits. The effectiveness of vocational rehabilitation is dependent on the desire of the disabled individual to make himself employable. The state plans, under the Vocational Rehabilitation Act, are designed to benefit those persons who, of their own volition, strive to overcome the handicaps which have made them unemployable. Although training is the primary function of the rehabilitation program, it is often necessary for the disabled participant to obtain personal health services to complete his rehabilitation. The cost of personal health services which the participant requires is ordinarily borne or shared by the government in relation to the individual's ability to assume that cost. The Association believes that the existing system for providing vocational rehabilitation should not be changed, and that disabled O.A.S.I. beneficiaries should participate in the state plans only if they desire to be rehabilitated. By requiring participation in the state rehabilitation program as a condition for obtaining O.A.S.I. disability benefits, H.R. 7225 would, in the Association's opinion, require the federal government to bear the complete cost of services for that group, including the cost of personal health services, without regard to the individual's ability to pay. The American Dental Association is opposed to the provisions of section 103(b) of H.R. 7225.

In behalf of the American Dental Association I wish to thank this Committee for the opportunity of expressing the Association's views on this important legislation. I request that the Committee include in the record the appendixes accompanying this statement.

APPENDIX

Following are the amendments to H.R. 7225 recommended by the American Dental Association.

1. The purpose of this series of amendments is to extend the system of elective coverage within the Social Security Act to self-employed dentists and to provide to those persons within the newly covered groups who are nearing age 65 or who are beyond that age a fair opportunity to acquire fully insured status and to qualify for maximum benefits.

a. Amend section 104(d) of H.R. 7225 to read as follows: "(d)(1) Paragraph (5) of section 211(c) of such Act is amended to read as follows: '(5) The performance of service by an individual in the exercise of his profession as a physician (determined without regard to section 1101(a)(7)), a dentist or as a Christian Science practitioner; or the performance of such service by a partnership.'

"(2) Section 211(c) of such Act is amended by adding at the end thereof the following new sentence: 'The provisions of paragraph (5) shall not apply to service performed by an individual in the exercise of his profession as a dentist during the period for which a certificate filed by him under section 1402(f) of the Internal Revenue Code of 1954 is in effect.'

"(3)(A) Section 214(a)(3) of such Act is amended to read as follows:

'(3) In the case of an individual who did not die prior to January 1, 1956, the term "fully insured individual" means any individual who meets the requirements of paragraph (2) and, in addition, any individual with respect to whom all of the quarters elapsing after 1955 and prior to (i) July 1, 1957, or (ii) if later, the quarter in which he attained retirement age or died, whichever first occurred, are quarters but only if there are not fewer than six of such quarters so elapsing.'"

"(B) Section 215(b)(2) of such Act is amended by striking out the word 'or' in subparagraph (A) and inserting after subparagraph (A), as amended, the following new subparagraph to be entitled subparagraph (B).

'(B) December 31, 1951, or'

"(C) Section 215(b)(2) of such Act is further amended by redesignating subparagraph (B) and subparagraph (C)."

b. Amend section 201(f) of H.R. 7225 to read as follows: "(f)(1) Section 1402(c)(5) of such Code is amended to read as follows: '(5) The performance of service by an individual in the exercise of his profession as a physician, a dentist or as a Christian Science practitioner; or the performance of such service by a partnership.'

"(2) Section 1402(c) of such Code is amended by adding at the end thereof the following new sentence: 'The provisions of paragraph (5) shall not apply to service performed by an individual in the exercise of his profession as a dentist during the period for which a certificate filed by him under subsection (f) is in effect.'

"(3) Section 1402 of such Code is amended by adding at the end thereof the following new subsection:

'(f) *Dentist.*

'(1) *Waiver Certificate.* Any individual who is a dentist may file a certificate (in such form and manner, and with such official, as may be prescribed by regulations made under this chapter) certifying that he elects to have the insurance system established by title II of the Social Security Act extended to service described in subsection (c)(5) performed by him in the exercise of his profession as a dentist.

'(2) *Time for Filing Certificate.* Any individual who desires to file a certificate pursuant to paragraph (1) must file such certificate on or before the due date of the return (including any extension thereof) for his second taxable year after 1955 for which he has net earnings from self-employment (computed without regard to subsection (c)(5) insofar as it relates to the performance of service by an individual in the exercise of his profession as a dentist) of $400 or more, any part of which was derived from the performance of service described in subsection (c)(5) insofar as it relates to the performance of service by an individual in the exercise of his profession as a dentist.

'(3) *Effective Date of Certificate.* A certificate filed pursuant to this subsection shall be effective for the first taxable year with respect to which it is filed (but in no case shall the certificate be effective for a taxable year with respect to which the period for filing a return has expired, or for a taxable year ending prior to 1956) and all succeeding taxable years. An election made pursuant to this subsection shall be irrevocable.'"

ASSOCIATION POLICY

The following is the statement of policy of the American Dental Association in regard to the total and permanent disability sections of the proposed Social Security amendments under H.R. 7225, 84th Congress.

1. The principles of voluntary vocational rehabilitation have been acceptable to the American Dental Association since 1939, on the ground of benefits to the individual, community and nation.

2. Vocational rehabilitation programs operated by state agencies with their specific objective of employment of the disabled individual have proved to be practicable. The imposition of federal authority to determine participation in the program, based on a broad definition of total and permanent disability not related to the objectives of vocational rehabilitation, will stimulate a very large demand upon these programs and threaten their effectiveness.

3. This extension of federal intervention into vocational rehabilitation, which involves personal health services, without evidence that the responsibility cannot be borne successfully at a lower level would violate the traditional principle of placing responsibility for personal health services with the individual and the community.

4. Establishment of the principle that the federal government may compel acceptance of personal health service benefits under the threat of loss of certain disability benefits is not consistent with the right of every American citizen to determine for himself the acceptance of these services, particularly in the absence of a demonstrated threat to public health and national interest.

5. The element of compulsion is not compatible with the basic requirement for successful vocational rehabilitation, namely, the enthusiastic participation of the individual to be rehabilitated.

6. The enactment of H.R. 7225 should be opposed so long as it contains provisions which are not consistent with this statement of policy.

BUREAU OF LIBRARY AND INDEXING SERVICE

The American Dental Association Film Library

The three 20-second television film spots which are described in this article were produced by the Association for distribution to dental societies and can be used by television stations throughout the year. They are available for rental ($1.50) from the Film Library for a two week period. This length of time has been granted to allow the television stations to have repeated showings. They are for sale ($10 each or three for $25) from the Order Department of the Association. The local societies may find it more expedient, however, to purchase prints since they can then be deposited with the stations to be used whenever the opportunity arises rather than to rent them for a limited time only.

The film, "Hypnosis in Dentistry," reviewed in this article, is available for rental ($2.50) from the Film Library, 222 E. Superior St., Chicago. This is the second film title on this subject now being circulated by the Film Library. A review of the other film, "Operative Hypnodontics," produced by A. A. Moss, D.D.S., appears on page 34 of the booklet, *Audio-Visual Materials in Dentistry*, available from the Film Library.

ADDITIONS TO FILM LIBRARY

TELEVISION SPOTS

Toothbrushing • 16 mm., black and white, sound, 20 seconds. Produced in 1956 by the Association. Technical direction by Sarra, Inc. A five year old girl, with a teddy bear, shows correct brushing technics in a sequence of scenes as a narrator explains the necessity of brushing teeth the right way at the right time.

Food and Dental Health • 16 mm., black and white, sound, 20 seconds. Produced in 1956 by the Association. Technical direction by Sarra, Inc. A youth of 15, in a series of scenes at a dinner table and at his high school locker, demonstrates right and wrong foods for dental health as the narrator explains that cutting down on sweets cuts down on dental decay.

Early Dental Care • 16 mm., black and white, sound, 20 seconds. Produced in 1956 by the Association. Technical direction by Sarra, Inc. A two and a half year old boy is shown at a mirror examining his teeth, in a dental chair and at lunch as the narrator points out that protection of a child's first teeth can help him toward lifelong dental health.

FILM REVIEW

Hypnosis in Dentistry • 16 mm., color, magnetic sound, 32 minutes. Produced in 1954 by James D. Jacoby, D.D.S. Photography by Fred English. For purchase arrangements, write to the producer, 720 N. El Camino Real, San Mateo, Calif.

This film demonstrates the technics involved in the training of dental patients to induce self-hypnosis and shows how various kinds of dental work are performed on patients while they are under hypnosis. The patient is introduced to the "relaxation technics" on the first visit by the use of a tape with the operator's personal instructions. The first patient shown is a woman in her thirties who has neglected dental care because of fear of the dentist. She is shown in the preliminary appointments while she is being trained to relax and then later while the necessary operative work is performed. The operator continually repeats the fact that she will never have any fear of a dentist and that she will never allow herself to be hypnotized by anyone except a dentist or physician.

The second patient is a 19 year old girl who had never visited a dentist on account of fear. As a result of this neglect, complete upper and lower immediate dentures were necessary. She, too, has had preliminary appointments for training in relaxation and self-hypnosis, and it appears that she is completely relaxed. The oral surgical procedures and the insertion of dentures are shown while the narrator gives posthypnotic suggestions to the patient. Throughout the demonstrations the need for assuring the patient that everything is well and for informing him or her

of any new taste or sound is stressed. The film concludes with a summary.

The film is well organized. It should be noted that the sound is magnetic rather than optical, and therefore a 16 mm. projector with a magnetic sound attachment is necessary. Without this attachment, the sound track cannot be heard. The nature of the subject makes the sound track, which repeats the operator's actual words used in dental appointments, more important to this film than it is to others.

Since the subject is controversial, dental societies, dental schools, study clubs, hospital dental staffs and Armed Forces personnel may find it provocative program material. Caution is suggested in publicizing it, however, to prevent "sensational" newspaper comments.

COUNCIL ON DENTAL THERAPEUTICS

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics has been described in a previous report (J.A.D.A. 40:489 April 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically, and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions for acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees and the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies* and may use the Seal of Acceptance, unless otherwise provided.

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics. It is the Council's opinion that Group B products may be promoted for special use and study.

The Council's initial consideration of products which may be eligible for Group B listing is influenced favorably by the knowledge of further investigations then in progress. It is the policy of the Council to reconsider Group B products each year on the basis of new evidence which may be produced in their support. Classification in this category is not ordinarily continued for more than three years.

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

The following additional class of products is classified in Group D:

Combinations of antibiotics with multiple vitamins which are promoted for routine use in the treatment of infections of dental origin. (See report on page 482).

Council classifies antibiotic-vitamin combination preparations in Group D

Following the publication of a National Research Council booklet entitled *Therapeutic Nutrition,*[1] several antibiotic manufacturers have marketed preparations which contain the usual oral dose of the antibiotic in combination with a mixture of vitamins. Of these preparations, the brands promoted most actively to the dental profession are Terramycin SF (oxytetracycline, Stress Fortified), Tetracyn SF (tetracycline, Stress Fortified), and Pen-SF (penicillin, Stress Fortified). A promotional card for Achromycin SF (tetracycline, Stress Fortified) with statements generally directed to physicians was also apparently mailed to dentists. There is no evidence that this product is actively promoted to dentists at this time. The preparations are formulated so that the average daily dose of the antibiotic will provide simultaneously the amounts of vitamins as shown in the first column of the table.

The advertisements for these products contain claims to the effect that dental situations requiring treatment with antibiotics are usually accompanied by a condition of physiologic stress in which the nutritional resources of the body are depleted with the result that healing and recovery proceed at suboptimal rates. The "Stress Fortified" preparations, it is claimed, will remedy the supposed deficiency and will accelerate healing and convalescence. Emphasis is placed on the importance of providing "needed vitamin support." "Dental patients, who are in need of antibiotic treatment, require the concurrent administration of stress formulated vitamins."[2] All of the claims purport to be based on the National Research Council booklet.[1]

The National Research Council has issued a statement which condemns as a misrepresentation of fact the use of its name in recommending this type of preparation.[3] Since the vitamin formulas were never considered by the Food and Nutrition Board to be final recommendations for general use, "use of the name of the National Research Council in connection with any products using the formulas as adjuvants to drug preparations is inexcusable." In addition, it was pointed out, the formulas were "considered tentative pending further research results" and the "need for critical reconsideration of the subject" is indicated. As a result, publication 234 (*Therapeutic Nutrition*[1]) was withdrawn.

The Council on Dental Therapeutics is aware of no scientific evidence that demonstrates a significant benefit to be expected from the combination of vitamins with antibiotics to be employed in the treatment of infection of dental origin. Because direct evidence is lacking, the Council reviewed the National Research Council bulletin which forms the mainstay of the firm's claims for the products.

In this booklet, authorized by the Committee on Therapeutic Nutrition of the Food and Nutrition Board, it is recognized that a state of serious nutritional depletion may develop in individuals undergoing stress as a result of prolonged febrile disease, major surgical procedures,

1. Pollack, Herbert, and Halpern, S. L. Therapeutic nutrition. Washington, D. C., National Research Council publication 234, 1952.

2. Pfizer Dental Topics, vol. 4, no. 4. Distributed June 1955.

3. Vitamin products support denied by Research Council. J.A.D.A. 50:735 June 1955.

severe trauma or certain debilitating conditions. The deficiency may develop partly as a result of the patient's inability to consume a good diet over a considerable period of time, and partly as a direct result of the altered metabolic requirements in disease and during convalescence. It is stressed that the most important single defect to be corrected during the recovery period is the negative nitrogen balance which develops; high protein diets are recommended specifically. A "standard therapeutic vitamin tablet or capsule" is suggested, of the composition shown in column 1 of the table; the values are up to ten times the recommended daily allowances[4] (column 2). Vitamin K is to be provided separately, and administered only when there is definite evidence of a lowered blood prothrombin level.

It is repeatedly emphasized in the booklet that these nutritional supplements are not needed by ambulatory patients consuming their diet, nor when the expected duration of the disease is less than ten days. The recommendations are intended to apply primarily to patients hospitalized with severe illness.

Patients in these categories are only rarely encountered in dental practice. In the light of present knowledge, the Council considers that there is no rational basis for the promotion of combined antibiotic and vitamin mixtures to the dental profession, and that statements which imply a need for such drug mixtures routinely for treating dental infections are misleading.

Table • Comparison of "therapeutic" formula with recommended dietary allowances

Factor	1 "Therapeutic" formula[1]	2 Recommended dietary allowances[4]*
Thiamine HCl	10 mg.	1.6 mg.
Riboflavin	10 mg.	1.6 mg.
Niacinamide	100 mg.	16 mg.
Calcium pantothenate	20 mg.	†
Pyridoxine HCl	2 mg.	‡
Folic acid	1.5 mg.	†
Ascorbic acid	300 mg.	75 mg.
Vitamin B_{12}	4 mcg.	†
Vitamin K (Menadione)	2 mg.	S.N.R.
Vitamin A	———	5,000 units
Vitamin D	———	S.N.R.

*Values for 25 year old man 65 kg. (143 lbs.) in weight. (These values are the highest shown for normal adults.)

†Data insufficient as a basis for a recommended dietary allowance.

‡Daily intake should be 1 to 2 mg. per day, readily provided by ordinary diets.[2]

S.N.R. Supplement not required.

A detailed discussion of the limited usefulness of vitamin preparations in dentistry may be found in *Accepted Dental Remedies, 1956,* in the chapter entitled "Nutritional Factors."

Because of the absence of evidence for their usefulness, the Council has voted to classify in Group D combinations of antibiotics with multiple vitamins which are promoted for routine use in the treatment of infections of dental origin.

4. Recommended daily dietary allowances, revised 1953. Washington, D. C. Food and Nutrition Board, National Research Council.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Number of dental graduates required in future years

With the establishment of several new dental schools in recent years and with plans being made for several more, a question arises as to the probable future need for increased numbers of dental graduates. Data are available which provide a basis for estimating the number of graduates required in future years.

The Bureau of the Census recently issued new projections of the United States population to 1975. Four projections were issued, based on different assumptions regarding fertility. The highest projection indicates a population of about 228 million by 1975 and the lowest projection about 207 million. The Bureau of the Census stated: "It is felt that all four series are reasonably possible, and no series is selected at this time as most likely."

The population estimate as of December 1, 1955, showed that during the first five months of the period covered by these projections, population growth was running a shade below the highest projection and well above the next lower projection. In the past, population projections generally have been too low.

The death rates used in this study are the death rates of white males from *United States Life Tables, 1949-51,* published by the National Office of Vital Statistics. The starting point for the study was the number of dentists listed in the 1955 *American Dental Directory,* which contained information as of mid-1954. The age distribution of these 95,883 dentists was determined by taking a sample consisting of every fourth dentist recorded in the Association's file of all dentists at mid-1954.[1] The death rates were applied to the number of dentists at each specific year of age to determine the number alive at each future year.

The percentage age distribution of dentists graduating in 1954, believed to be reasonably typical of future classes, was used for all subsequent graduating classes. From the age-specific death rates of white men, special death rates were developed for graduating classes of dentists. For instance, it was determined that the proportion of a graduating class still alive was .99822 after one year, .99639 after two years, and .93023 after 20 years.

This study, although based on the best data available, is not without sources of error. When the age distribution of dentists was determined, the year of birth was missing for about 10 per cent of the dentists listed in the Association's file. It is believed that the dentists for whom this information was missing were generally the older dentists. If so, the age distribution as determined in the study is biased downward, dentists are actually older than the age study indicated, death rates of dentists in this study are too low, and the number of graduates should be greater than indicated.

A study recently published by the Bureau of Economic Research and Statistics showed that dentists lived longer than nondentists of similar age distribution. It was not possible in the mortality study to establish death rates *per se* for dentists because of incomplete data on number of deaths. The error incurred through the fact that dentists live longer than nondentists tends to offset the error

1. American Dental Association, Bureau of Economic Research and Statistics, The ages of dentists, 1954. J.A.D.A. 50:330 March 1955.

Table 1 • Projections of the total population of the United States for July 1, 1956 to 1975

Year	Population projection			
	AA	A	B	C
1956	168,062,000	167,759,000	167,759,000	167,566,000
1957	170,868,000	170,263,000	170,263,000	169,834,000
1958	173,682,000	172,774,000	172,774,000	172,067,000
1959	176,511,000	175,299,000	175,299,000	174,273,000
1960	179,358,000	177,840,000	177,840,000	176,452,000
1965	193,346,000	190,296,000	190,296,000	186,291,000
1970	209,380,000	204,620,000	202,984,000	196,370,000
1975	228,463,000	221,522,000	214,580,000	206,907,000

Source: Revised Projections of the Population of the United States, by Age and Sex: 1960 to 1975. Current Population Reports, Population Estimates, Series P-25, No. 123, Bureau of the Census, October 20, 1955.

incurred by downward bias in the age distribution.

Although death rates of white men were used, there are about 2,000 women dentists and about 1,700 negro dentists. Since death rates of women are lower than those of men, and death rates of negroes are higher than those of white persons, the net error thus incurred is probably very small.

No allowance was made for the graduates of United States schools who go abroad to practice, or for the dentists coming from abroad to practice in the United States. Death rates were based on 1949-1951 experience and are likely to continue downward; however, in the population predictions no improvement in mortality rates was assumed after 1960.

Age 68 was selected as the cutting point in this study because the number of dentists under 68 is approximately equal to the number of dentists active in the profession. It is recognized that many dentists are active in the profession well beyond this age. It is also true that many dentists retire at earlier ages, and that a small number of dentists leave dentistry for other occupations relatively early in their working life. It is believed, however, that the number of dentists who are 68 and older who are active is approximately equal to the number of dentists under 68 who are not active in the profession. The number of dentists under 68, therefore, is used throughout this study to represent the number of active dentists.

The four population projections are shown in Table 1. Series "A" and "B" are identical through 1965. Series "AA" was based on the assumption that the 1954-55 fertility level (age-specific birth rate) would continue to 1975; Series "A" on the assumption that the 1950-53 level would continue to 1975; Series "B" on the assumption that the 1950-53 level would continue to 1965, then decline to about the prewar level by 1975, and Series "C" on the assumption that the 1950-53 level would decline from 1953 to about the prewar level by 1975. The low series previously published, Series "D", was dropped because it no longer seemed reasonably possible.

Linear interpolation was used to project populations for years not covered in

Table 2 • Number of dental graduates required in each year through 1975 to maintain ratio of population to dentists under 68 at 1,886 under each population projection

Year	Number of graduates required under population projection			
	AA	A	B	C
1956	3,411	3,251	3,251	3,148
1957	3,417	3,256	3,256	3,132
1958	3,611	3,451	3,451	3,302
1959	3,609	3,446	3,446	3,276
1960	3,968	3,804	3,804	3,612
1961	3,903	3,740	3,740	3,460
1962	4,068	3,905	3,905	3,626
1963	4,159	3,992	3,992	3,710
1964	4,237	4,071	4,071	3,795
1965	3,968	3,802	3,802	3,520
1966	3,330	3,148	2,975	2,693
1967	5,153	4,968	4,793	4,512
1968	4,118	3,930	3,758	3,471
1969	4,075	3,885	3,709	3,433
1970	4,180	3,994	3,821	3,533
1971	4,499	4,265	3,700	3,577
1972	4,453	4,212	3,646	3,525
1973	4,412	4,171	3,605	3,484
1974	4,484	4,244	3,675	3,550
1975	4,403	4,160	3,592	3,467

Table 3 • Expected number of dental graduates, total number of dentists under 68, and ratio of population to dentists under 68 under each population projection, 1956 through 1960

Year	Expected no. of graduates	No. of dentists under 68	Population-dentist ratio under population projection		
			AA	A & B	C
1956	3,019	88,718	1,894	1,891	1,889
1957	3,093	89,883	1,901	1,894	1,890
1958	3,140	90,904	1,911	1,901	1,893
1959	3,275	92,072	1,917	1,904	1,893
1960	3,360	92,977	1,929	1,913	1,898

the published report, as suggested by the Bureau of the Census.

At mid-1955 the total population was estimated at 165,248,000, and the number of dentists under 68 was 87,599. There was one active dentist for each 1,886 persons.

Table 2 shows the number of dental graduates needed each year to maintain the population-dentist ratio at 1,886 under each of the four population projections. The number of graduates required in each year is dependent on three variables: (1) number of dentists under 68 who died during the year, (2) number of dentists reaching 68 and thus presumed to be retired and (3) the increase in population.

It will be noted that there are some rather severe fluctuations in number of graduates required, particularly between 1964 and 1971. This condition results from severe fluctuations in number of dental graduates between the years 1919 and 1925. The number of graduates during these years varied as follows: 3,587, 906, 1,795, 1,765, 3,271, 3,422 and 2,590. These classes will reach 68 years of age during the period 1964 to 1971.

The actual number of graduates available can be estimated closely through 1960. The present freshman class will be the graduates of 1959 and the size of next fall's freshman class, the graduating class of 1960, is known fairly accurately.

Inspection of Table 3 reveals that the number of graduates expected through 1960 falls considerably short of the number required to maintain the present ratio, even under the lowest population projection. During the five year period, a net difference of 582 additional graduates would be required under the "C" projection, and 2,123 more graduates under the "AA" projection, in order to have the present population-dentist ratio in 1960. "The die is cast" for the next five years, and there appears to be no chance of avoiding under-production of dentists during this period.

This being true, the figures in Table 2 are mainly of academic interest. Since the number of dental graduates through 1960 is already fixed, it is more practical to study the number of graduates required after 1960.

Table 3 shows the population-dentist ratio expected in 1960 under each population projection. Table 4 shows the number of graduates needed to reestablish the ratio at 1,886 in 1975. The population growth for individual years has not been considered in this table. Rather, a uniform yearly increase in number of grad-

Table 4 • Number of dental graduates required each year after 1960 to reestablish ratio of population to dentists at 1,886 by 1975 under each population projection, with uniform yearly increase in number of graduates

Year	Number of graduates required under population projection			
	AA	A	B	C
1961	3,485	3,454	3,423	3,369
1962	3,611	3,549	3,487	3,418
1963	3,736	3,643	3,550	3,447
1964	3,861	3,737	3,613	3,476
1965	3,986	3,832	3,677	3,506
1966	4,112	3,926	3,740	3,535
1967	4,237	4,020	3,803	3,564
1968	4,362	4,115	3,867	3,593
1969	4,488	4,209	3,930	3,622
1970	4,613	4,303	3,993	3,651
1971	4,738	4,398	4,057	3,680
1972	4,863	4,492	4,120	3,709
1973	4,989	4,586	4,183	3,739
1974	5,114	4,680	4,247	3,768
1975	5,239	4,775	4,310	3,797

uates is shown. It follows, then, that the ratio would be lower than 1,886 in the years between 1960 (or, for that matter, 1956) and 1975.

The annual increase in number of graduates required (rounded to nearest whole number) under Series "AA" is 125; under Series "A" it is 94; under Series "B" it is 63, and under Series "C" it is 29.

Among people concerned with the problem, there is general agreement that the present number of dentists is not excessive. Many authorities are of the opinion that there is a shortage of dentists. For this reason the number of graduates needed to improve the population-dentist ratio is shown in Table 5. This table shows the number of graduates needed yearly after 1960 to establish ratios of 1,850 and 1,800 by 1975, with a uniform yearly increase in number of graduates.

The annual increases in number of graduates during the period 1961 through 1975 were determined by an algebraic formula, which, with terms collected, is as follows:

$$49{,}619 + 118.8454x = A$$

"A" equals the total number of living post-1960 graduates needed in 1975 and "x" equals the annual increase in graduates needed over the 3,360 graduates in 1960. The number of pre-1961 graduates expected to be living in 1975 is 56,627.

By using the above formula, the annual change in number of graduates required to produce any total number of dentists in 1975 can be readily calculated. For example, assume that 150,000 dentists are wanted in 1975:

$$\begin{aligned} 150{,}000 - \ 56{,}627 &= 93{,}373 = A \\ 49{,}619 + 118.8454x &= 93{,}373 \\ 118.8454x &= 43{,}754 \\ x &= 368.16 \end{aligned}$$

An annual increase of 368 graduates, over the 3,360 graduates in 1960, would be needed in order to produce a total of 150,000 dentists in 1975.

The expected number of deaths and retirements of dentists through 1960 is shown in Table 6. Dentists dying at age 68 or older should not be considered as

Table 5 • Number of dental graduates required each year after 1960 to establish ratio of population to dentists at 1,850 and at 1,800 by 1975 under each population projection, with uniform yearly increase in number of graduates

	Number of graduates required under population projection							
	AA		A		B		C	
Year	Ratio 1,850	Ratio 1,800	Ratio 1,850	Ratio 1,800	Ratio 1,850	Ratio 1,800	Ratio 1,850	Ratio 1,800
1961	3,505	3,534	3,474	3,502	3,442	3,469	3,407	3,433
1962	3,650	3,708	3,587	3,643	3,524	3,578	3,454	3,506
1963	3,795	3,882	3,701	3,785	3,606	3,687	3,501	3,580
1964	3,940	4,056	3,814	3,926	3,688	3,796	3,548	3,653
1965	4,086	4,230	3,928	4,068	3,770	3,905	3,595	3,726
1966	4,231	4,404	4,041	4,209	3,852	4,015	3,642	3,799
1967	4,376	4,578	4,155	4,351	3,934	4,124	3,690	3,873
1968	4,521	4,752	4,268	4,492	4,016	4,233	3,737	3,946
1969	4,666	4,926	4,382	4,634	4,098	4,342	3,784	4,019
1970	4,811	5,100	4,496	4,775	4,180	4,451	3,831	4,092
1971	4,956	5,274	4,609	4,917	4,262	4,560	3,878	4,165
1972	5,101	5,448	4,723	5,058	4,344	4,669	3,925	4,239
1973	5,247	5,622	4,836	5,200	4,426	4,778	3,972	4,312
1974	5,392	5,796	4,950	5,342	4,508	4,887	4,019	4,385
1975	5,537	5,970	5,063	5,483	4,590	4,996	4,066	4,458

Table 6 • Number of deaths and number of dentists reaching 68 for years ending July 1, 1956 through 1960

Year	Number of deaths			Number reaching 68	Lost through death and retirement
	Total	68 & older	Under 68		
1956	1,669	758	911	989	1,900
1957	1,715	784	931	997	1,928
1958	1,760	808	952	1,167	2,119
1959	1,802	838	964	1,143	2,107
1960	1,842	864	978	1,477	2,455

Table 7 • Number of dentists 68 years of age and older, July 1, 1956 through 1975

Year	Number
1956	9,974
1957	10,187
1958	10,546
1959	10,852
1960	11,465
1965	14,554
1970	16,158
1975	16,702

losses to the profession at death because they are so considered at retirement. The sharp increase in number of dentists reaching 68 in 1960 apparently reflects the increase in number of graduates from 2,388 in 1915 to 2,835 in 1916.

The increasing number of dentists of retirement age is shown in Table 7. Total number of dentists for years through 1960 can be obtained by adding number of dentists over 67 in Table 7 to number under 68 in Table 3. The total expected in 1960 is 104,442. The total number of dentists for years after 1960 will depend on the size of graduating classes after that year.

The use of the statistics in this study for purposes of determining the need for new schools (or expansion of present schools) is highly dependent on choice of the correct population projection. Although the Bureau of the Census has indicated that the four projections appear equally likely, current population growth is almost equal to the highest projection. It is worthwhile to note that none of the projections assumes a higher fertility than the current level, and that past population projections have been too conservative. The "C" projection appears most improbable on the basis of recent and current experience. Of the four projections, Series "A" appears to be possibly a little safer choice than the other projections.

Under Series "A" an increase of 94 graduates per year after 1960 will be necessary to restore the population-dentist ratio to 1,886 by 1975. Schools established recently have graduating classes of about 50 students. Under Series "A" then, nearly two new schools, or the equivalent in expansion of existing schools, will be required each year between 1957 and 1971 in order to reestablish the population-dentist ratio at 1,886 by 1975.

B. Duane Moen, director

COUNCIL ON DENTAL RESEARCH

Addition to list of certified dental materials

Since the publication of the most recently revised List of Certified Dental Materials (revised to November 1, 1955), the following material which conforms to the American Dental Association Specification No. 12 for Denture Base Resins, Second Revision, has been added.

CERTIFIED DENTURE RESINS (A.D.A. SPECIFICATION NO. 12, SECOND REVISION)
TYPE I, HEAT-CURING

Material	*Form*	*Manufacturer or distributor*
Biolux "521"	Pink; powder-liquid	B. L. Dental Company, Inc.

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LON W. MORREY, D.D.S., EDITOR
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THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

For a National Dental Research Institute now!

Currently both branches of the United States Congress are considering legislation which promises to vitalize what for the last eight years has been the under-nourished member of the health research family. The legislation will provide five million dollars for the construction of a building for the National Institute of Dental Research—a structure which the Congress approved in 1948 but for which it has failed to appropriate funds.

The leading House bill (H.R. 9087) was introduced by Rep. J. Percy Priest (D., Tenn.), long a staunch advocate of dental research and preventive dentistry. An identical bill (S. 3246) was introduced in the Senate by Sen. James E. Murray (D., Mont.), whose interest in dental research is well known to the profession. Both the House and the Senate bills provide "That Section 5 of the 'National Dental Research Act' approved June 24, 1948 . . . is amended by striking out $2,000,000 and inserting in lieu thereof $5,000,000." Both bills are nonpartisan, having been sponsored by members of both parties.

House bills also were introduced by Representative Wolverton (R., N.J.), Representative Boland (D., Mass.) and Representative Long (D., La.). Representative Long is an active member of the American Dental Association. Cooperating with Senator Murray in sponsoring the Senate bill are Senators Allott (R., Colo.), Bender (R., Ohio), Douglas (D., Ill.), Hill (D., Ala.), chairman of the Committee, Ives (R., N.Y.), Kennedy (D., Mass.), Lehman (D., N.Y.), McNamara (D., Mich.) and Neely (D., W. Va.).

The urgent need for adequate centralized facilities for basic investigations into factors relating to the cause and prevention of oral diseases cannot reasonably be

questioned by anyone interested in the total health of the nation. Disorders of the oral cavity present problems unique unto themselves as do disorders of the heart, the lungs, the joints and other organs and tissues. Researchers who are devoting their talents and their lives to the solution of the problems of dental diseases should have the advantage of working together and studying together within easy access of each other. Simple economy also dictates the provision of adequate technical assistance for the highly trained scientists to make their work more productive. It is therefore important that a building with adequate space for such personnel be provided.

Researchers at the National Institute of Dental Research are quartered in several separate buildings in temporary space graciously assigned by institutes in other fields of research. As those other institutes become pressed for space, the dental researcher is pushed into other and less satisfactory quarters. Attempting to conduct a program of dental research under these conditions is somewhat similar to a dentist's trying to build up a satisfactory practice in temporary office space borrowed from another dentist. Sooner or later the quarters become cramped and all parties—including the patients—suffer.

Representative Priest, Representative Long, Senator Murray and their fellow legislators are to be commended for their grasp of the nation's dental problem and the clarity with which they view the needs for dental research. It is to be hoped that their understanding will be shared by others in the Congress this session, thereby insuring the early construction of a national institute building dedicated to the eradication of all forms of dental disease.

April seventh: World Health Day

The eighth anniversary of the establishment of the World Health Organization as a permanent group will be observed on April 7. Membership in WHO, which is open to all states, now totals 85 countries.

Dentistry, as one of the health professions, supports WHO as it supports all worthwhile movements designed to improve man's health.

Although the theme for this year's World Health Day—"Destroy disease-carrying insects!"—seems at first glance to be of little or no import to dentistry, dentists as members of a health profession have more than academic interest in the subject.

In the concerted effort to realize eventually the goal set by the 1956 World Health Day, it is hoped that those in charge will discriminate between insects which are known to be disease vectors or otherwise harmful to man, and those which are not only harmless but are beneficial. Those insects, for instance, that produce such articles of commerce as silk, wax, lac and honey, and some of the insectivorous or entomophagous insects that feed on other insects, should not become targets in the drive to rid the earth of those that comprise man's enemies.

Unapproved seminars in hypnosis draw fire

The American Society of Psychosomatic Dentistry has recently arraigned the sponsors of so-called seminars in hypnosis which are presented without the approval of a recognized dental society or institution of learning. The text of this indictment is published on page 463 of this issue.

This action is worthy of mention because it is the first time in recent years, at least, that a dental organization has cautioned officially against the indiscriminate use of hypnosis by dentists partially and sometimes illy trained in its application. The warning comes a bit late as the wave of dental interest in hypnotic phenomena seems to have passed for the moment. Other waves will follow, however, as they have followed each other at irregular intervals since the days of Mesmer and his animal magnetism almost two hundred years ago.

That functional changes in the nervous system can be produced by hypnotism has been fully demonstrated. Nevertheless, scientists do not agree on a final explanation of the phenomena. Even the term itself means different things to different people as pointed out by D. N. Rhodes in a recent issue of *American Mercury*.[1] Although the term "hypnosis" is derived from the Greek word "hypnosos" meaning "sleep," most of the more modern students of the subject agree that natural sleep plays no part in the hypnotic state. James Baird, well known for his investigations of the subject during the early nineteenth century, was among the first to differentiate between sleep and hypnosis. Freud employed hypnotism extensively in his early psychoanalytical studies. Other psychologists have reported favorably on the use of hypnotism in the fields of anesthesiology, diagnosis and therapeutics.

The results obtained and the observations made by a thoroughly trained, highly skilled psychologist are one thing; the enthusiastic reports of dental practitioners who have little or no basic training in psychology and whose experience has been limited to attendance at a few classes conducted by demonstrators or lecturers on the subject is quite another. As Mr. Rhodes cautions: "How far the mind can go in actually creating psychologic and physiologic changes is not known, for this is a frontier of hypnotic science which has not been completely explored."

Even after the frontiers of the hypnotic state have been completely explored and even if found free of danger, hypnosis as an adjunct to dental practice will find slow acceptance. The phenomenon has been associated for so many years with the supernatural, the unknown, the bizarre and the mysterious, with "sleep cures" and "faith cures" that the vast majority of the public and the profession will elect to use more acceptable forms of treatment. Nevertheless the use of hypnosis as an anesthetic agent, like the use of all other anesthetic agents, should be thoroughly and adequately explored by competent authorities. If and when such authorities approve of the procedure, qualified courses should be established for the training of dentists in its use.

Under the nation's Pure Food and Drug Act, now in its fiftieth year of operation, no drug can be placed on the market until it has undergone adequate tests to prove its purity, potency, effectiveness, toxicity and safety. The precautions established by the same law might well apply to the use of hypnosis.

The American Society of Psychosomatic Dentistry is quite right in issuing its timely warning.

1. Rhodes, D. N. Anesthetic, diagnostic and therapeutic hypnosis: trick or treatment? Am. Mercury 41:59 Oct. 1955.

Migrating Americans

Dentists are not the staid, firmly rooted citizens they are commonly supposed to be, according to statistics supplied by the Bureau of Economic Research and Statistics of the Association. Dentists, in fact, seem to be growing increasingly peripatetic. During 1954-1955, approximately 10,000 dentists moved from state to state, in or out of the federal dental services or to and from United States territories and possessions and foreign countries. This figure represents almost twice the number of similar moves made by members of the profession in 1950 and 1951 (5,792), and almost three times that of 1948 and 1949 (3,738).[1]

According to the Directory and Membership Records Department of the Association—the agency directly responsible for the publication of the annual *American Dental Directory*—19,106 changes in dentists' addresses were recorded for the ten month period beginning August 1, 1954, and ending May 31, 1955, or approximately 20 per cent a year. That an occasional wrong address creeps into the annual dental directory, under these circumstances, is understandable.

If dentists are imbued with the spirit of wanderlust, the same is true of the population they serve. Moving day is a national institution observed each year by almost 20 per cent of the population, according to the Bureau of the Census.[2] In a twelve month period ending last April, 31,492,000 persons moved. About 21,000,000 moved within the same county. About 5,500,000 moved to another county in the same state. Almost 5,000,000 moved to a different state.

The national moving ratio for the year was 19.9 per cent. The rural-nonfarm areas, chiefly suburbs, showed the greatest rate of moving in the latest survey—22.1 per cent. The rural-farm areas showed the smallest rate—14.5 per cent. Those in the West showed the greatest tendency to move whereas those in the Northeast moved the least, the proportions being more than two to one. In recent years, nonwhites have tended to move more than whites, whereas whites have tended to travel longer distances, according to the census bureau survey.

This increasing tendency of Americans to be "on the move" points up the increasing value of the *American Dental Directory,* the sixth edition of which was recently published.[3]

In the light of the reports of the Bureau of the Census and the Association's Bureau of Economic Research and Statistics and the Directory and Membership Records Department, the increasing demand by dentists for the *Directory* is no accident.

Most of the subscribers to the *Directory* are individual practitioners, who use the information therein for patient referral, and to keep track of classmates and friends. With one out of each five Americans moving each year, on the average, the 1,200-page *Directory* is an invaluable reference work to have around the office, even though it contains a few errors in addresses, caused by dentists' proclivity for change. It lists the names and addresses of more than ninety-seven thousand dentists in the United States, alphabetically, geographically and by specialties. Copies of the new *Directory* are still available from the Association at the nominal price of $7.50.

1. Moen, B. Duane. Relocation of dentists during 1950 and 1951. J.A.D.A. 45:215 Aug. 1952.
2. New York Times, Oct. 28, 1955.
3. The American dental directory. Editorial. J.A.D.A. 51:476 Oct. 1955.

Recent publication of Congressional appropriations hearings discloses that House members are more critical of medical fees than dental. At closed session hearings on the Veterans Administration budget for 1956-57, fees paid for services in the VA's "home town medical care" program were closely scrutinized. By contrast, committee members did not even mention dental fees, confining their attention to prospects for reducing the backlog of applications for "home town dental care" of eligible veterans.

A portion of the official transcript is illustrative:

Rep. Joe L. Evins (D., Tenn.): "I wanted to ask you gentlemen how extensive is your backlog of dental applications, in round figures. Tell us for the record without having to boll weevil through all the charts."

L. F. Schoen (VA controller): "In terms of dollars?"

Representative Evins: "No, not in terms of dollars; in terms of applications of your backlog—your caseload."

Mr. Schoen: "In December 1955 we had an outpatient dental backlog of 107,000 cases."

Representative Evins: "107,000 cases awaiting attention."

Rep. John Phillips (R., Calif.): "Get in the record right there what they expect to have on July 1 and what they say they expect to have the following July 1."

Representative Evins: "I was going to ask them about the time lag. Approximately what is the time lag between the time the application is filed and treatment is authorized?"

Mr. Schoen: "Twelve months average."

Representative Evins: "And it takes a year from the time an application is filed until the veteran is called for treatment?"

Mr. Schoen: "It would vary between offices to some extent."

Representative Thomas (D., Texas): "How much money would it take to reduce this backlog to a reasonably current status?"

J. D. Baker (VA budget officer): "We believe the amount we asked for will get us down to about 32,000 backlog by the end of 1957 and with an 88,000 backlog at the end of the current year, so we will be dropping from 88,000 next June 30 to 32,000 a year later."

Representative Thomas: "That really cuts your backlog down in 1957."

Representative Phillips: "Will you yield for just another question? That is, whether they can get the dentists needed to reduce it more rapidly. I think that would be an important question."

Mr. Schoen: "The point is, we do have. We spent approximately 7 or 8 million dollars in the first half of the year, which leaves us 3 million dollars for the second half out of a current appropriation. Therefore, we have been able to authorize up to 8 million dollars in half a year. So that in the balance of the year we have 3 million dollars left to operate against a potential capacity of some 8 million dollars for the balance of the year."

Representative Evins: "Is the VA satisfied with the progress it is making and with the sufficiency of the funds in the present budget for this purpose?"

Mr. Schoen: "Yes, sir; within the sum for the two years, fiscal years 1956 and 1957. By the end of 1957, there will be what we call an operating backlog which would be two months' work, roughly."

Representative Thomas: "You and the Budget Bureau have reached an agreement on this item, then. You will have it down to within manageable size, we will say, at the end of 1957."

Final outcome of these interrogations of Veterans Administration officials was that the committee approved—and the House passed—a total of $82,638,000 for outpatient medical and dental care. Of this amount, $8,415,000 will be earmarked for fee basis ("home town") dental care and $8,312,500 for medical. The remainder will defray expenses of outpatient medical and dental care given in VA facilities by its own staff personnel. The dental fee budget will be $2,865,000 smaller than the one in effect during the current fiscal year, which ends June 30, 1956.

Action by the Senate remains to be taken on the Veterans Administration appropriations bill, but it is probable that no change will be made.

DENTAL RESEARCH

Also published recently are proceedings of appropriations hearings conducted on dental health activities of the U. S. Public Health Service. Principal witnesses on this subject were John W. Knutson, chief dental officer of the USPHS, and Harold Hillenbrand, secretary of the American Dental Association.

Dr. Knutson was questioned in detail on federal support of dental research, fluoridation of water and studies of dental economic problems. Dr. Hillenbrand's testimony was concerned chiefly with the need for greater financial assistance to dental research.

As a result of the strong case made for research, the House passed a bill appropriating $1,300,000 for dental research grants. This compares with $800,000 which had been recommended by the White House and $421,000 that was provided for the current fiscal year. Altogether, the House-passed bill contains $3,471,000 for USPHS dental health activities. Major items, besides that for research grants, are $876,500 for intramural scientific investigations in the National Institute of Dental Research; $694,200 for professional and technical assistance to states and local communities (for fluoridation and other purposes); $300,000 for research fellowships, and $196,100 for coordination and development of dental resources. The latter category includes dental manpower studies and further investigation of the practicability of dental care prepayment plans.

Dr. Knutson's statement to the committee said in part:

"The Public Health Service has initiated studies of the potentialities inherent in prepayment and postpayment plans as a means for widening the availability of dental service to a larger proportion of low and middle-income groups. The practical and growing necessity for such studies has already become apparent from the requests of State health officials, dental societies and medical care administrators for information and for results of operating experience.

"Increases in funds for 1957 have been requested to assist in accelerating and expanding the investigation of problems associated with the financing of dental care. To determine the applicability to dentistry of various methods of payment, we propose to undertake two categories of research: (1) Collection of actuarial data and development of prototypes for voluntary prepayment and postpayment plans, and (2) conduct of utilization and cost studies of dental care programs supported by labor and industrial organizations."

At its quarterly meeting held on February 27, the National Advisory Dental Research Council devoted considerable attention to placement of greater emphasis on science departments of universities and graduate schools as vehicles of dental research. With the substantial increase that has been provided for research grants, it is likely that a serious effort will be made to enlist the participation of anatomists, biochemists, zoologists and other basic scientists in the grants program.

International Correspondence

NEWS FROM GREAT BRITAIN

The Committee of Enquiry, known as the Guillebaud Committee after its chairman, C. W. Guillebaud, C.B.E., was set up in 1953 to review the cost of the National Health Service and to make recommendations. Its report has now been presented to Parliament and is published by Her Majesty's Stationery Office, London Camden 9663, cost, $1.26. An editorial in the *British Dental Journal* comments on this report as follows.

The largest section of the report is devoted to the consideration of the hospital and specialist services, and it is regrettable that the committee expresses itself as "welcoming the suggestion . . . for a new specialist grade, below the grade of consultant." This proposal if adopted would come very close to creating a junior type of consultant with the inevitable danger that the proper development of the consultant service might be prevented.

The committee has throughout its report outlined the evidence on a variety of matters, summarizing the arguments for and against any particular suggestion and concluding the sections with paragraphs containing its own view.

The section on the General Dental Services begins with a factual examination of the position and of the changes, including those in remuneration, which have occurred since the start of the National Health Service. The report then proceeds to "Points Raised in Evidence," in which the shortage in manpower, the importance of prevention, the possibilities of fluoridation, the need for sustained research and for dental health education are emphasized.

All will agree with the report's summary of the qualities necessary for adequate dental health education. "If it is to be really effective," the report says, "dental health education must start with the expectant mother and the care of her unborn child." Of fluoridation, it says, "If the amount of dental caries in the population can be reduced by a preventive measure of this kind without any undesirable side effects on the population, then the door will be open to one of the most welcome means of economy in the Service, i.e., one which will at the same time improve the health of the public and reduce the cost to the Exchequer."

The committee also favors the introduction of operating ancillary workers and, while admitting that "it may be that there are professional matters here which lie outside our competence," adds that, nevertheless, in its judgment, "there would seem to be a prima facie case for the employment of dental ancillaries in the dental service, and we hope that the profession itself will consider the matter afresh in all its aspects—national as well as professional."

Many members of the profession will regret such a decision from such a body, and some may well share the dubiety expressed by the committee itself as to the propriety of its expressing any opinion on the matter.

The views of the committee on fees for treatment under the National Health Service have attracted much attention, especially in the lay press. These views are divided into three parts. First, the committee expresses a general dislike of fees. Secondly, it feels that, considering both the national economic position and the shortage of dentists, charges for dentures are justified and should be retained. Thirdly, in relation to charges for treatment the committee considers that "the charge . . . is in fact impeding a number of people from making use of the general dental service," and it urges that the "reduction of the incidence of this charge" should have "the highest priority when additional resources become available."

As to the means by which this should be done, the committee states that its members "strongly favour the proposal put forward by the British Dental Association that the dental treatment charge should be refunded to patients who have received comprehensive treatment, been made dentally fit, and have sought treatment within a specified period of time (say, once every 12 months)."

BRITISH DENTAL ASSOCIATION

In a report from the remuneration subcommittee of the General Dental Services Committee, there appear some interesting paragraphs on the decline in earnings of practitioners in late middle age and over.

A resolution had been passed by the Annual Conference of Local Dental Committees calling on the General Dental Services Committee to do its utmost "to see that the earning power of the older dentist working in the National Health Service is safeguarded so that he is adequately recompensed for his experience rather than penalised for his advancing years." The subcommittee stated that it could see no

solution of the problem short of the introduction of a salaried service, which it felt would not be popular with the profession.

Consultation with the Association's actuary has made clear that, short of any substantial increase in the scale of fees, there is no short-term solution to the problem of improving the remuneration of the older general practitioner.

PUBLIC DENTAL SERVICE

In the annual report for 1954 of the Staffordshire County Council, the principal dental officer, Mr. Winter, reports these facts.

The county, which contains both industrial and rural areas, has an estimated school population of 126,556. Roughly half the children were dentally inspected during the year, the highest number since 1948. Of the children inspected, 42,681 were found to have defects; 36,523 were referred and 32,163 actually accepted treatment. Average number of fillings per child was 1.5, a fairly consistent figure.

Average number of extractions per visit was 2.0 compared with 1.9 for the previous year, a change indicative, as Mr. Winter says, of the general worsening of the dental condition of the school population as a whole. The emergency or special cases jumped from 7,887 in 1953 to 9,017 in the year under review, an increase which inevitably eats into the time which a strictly limited staff should be devoting to routine preventive work.

Some pertinent observations are made on the speed at which dental officers work. Each officer, with full clinical freedom, has his own rate of working, which remains fairly constant over a period of years. When the limited staff is working to full capacity, allowance must be made for variations in production between staff members. Wisely, it is not considered advisable to make any attempt to accelerate output of the slower operator to emulate his faster colleague.

The profession as a whole is due to suffer serious loss of manpower during the next five years owing to death and retirement. The loss, it seems, will not be matched much less surpassed by recruitment. If the present attitude of legislative authority and the professional outlook is an indication, the School Dental Service manpower problem will be incapable of resolution.

ITEMS OF INTEREST

Passage of the dentists' bill is in its final stages. January 26 the debate on the report and the third reading took place in the House of Commons. The bill was then taken to the House of Lords where it was debated February 6.

The Embryologists' Club is an informal society, and one of the principal meetings of the year is devoted to a symposium. This year the subject of the symposium was tooth development. The meeting was held at University College, London, January 6, with Dr. M. Abercrombie in the chair.

This is the first occasion on which this society has held a symposium on a dental subject, and the success of the meeting is some measure of the amount of fundamental dental research that is going on in this country and of the interest in teeth and tooth development that exists among biologists generally.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

NEWS FROM MEXICO

The Pan-American Council of Dentistry for Children met recently in the Dental School of the City University of San Angel in Mexico. Distinguished dentists from the Americas, including Samuel Harris of the United States and Antonio Leti of Argentina, were featured speakers. The latest advances in clinical dentistry and pedodontic technics were presented by specialists in the field.

Pamphlets covering the material discussed in the meetings were prepared for distribution among the dental associations of the various countries. The working sessions were presided over by Dr. Harris, president of the Council, and by the secretary, Dr. Antonio Montero of Havana, Cuba. The success of the meeting was due in large part to the Mexican organizers of the event. They were: Antonio Fragoso, José Fernández Beltrán, Fanny Sánchez Mora, María Elena Castro, Alicia Arellano Tapia and Isabel Córdoba. The Mexican press gave extensive coverage to the council's meeting.

Elected to office for the next term were Carlos Criner of Cuba, president; Benjamin Gomes of Colombia, president-elect; Antonio Fragoso of Mexico, vice-president, and Antonio Montero of Cuba, secretary. Also elected were Al Anderson of the United States, treasurer; Samuel Leyte of Argentina, editor, and Samuel D. Harris of the United States, chairman of the executive committee.

Countries now officially members of the Council are Colombia, Nicaragua, Cuba, Mexico, the United States and Canada. Argentina, Guatemala and El Salvador are expected to join shortly.

Association Affairs

RESEARCH NOW UP TO SENATE AS HOUSE VOTES MORE FUNDS

Dental societies and individual dentists are urged to write or wire their Senators immediately to support increased federal funds for dental research. Action by the profession is required to buttress Association testimony that expanded research is the only realistic means of combating the nation's staggering toll of dental disease.

Passage by the House of Representatives March 5 of a $500,000 increase in the proposed appropriation for research grants administered by the National Institute of Dental Research brings to a close part one in the Association's current drive for increased federal research funds. The House vote followed Association testimony before the House Appropriations Committee. Action now is up to the Senate.

As THE JOURNAL went to press in mid-March, the Association was preparing testimony for presentation March 28 before the Senate Subcommittee on Health, Education and Welfare of the Senate Appropriations Committee. The Association planned to tell the Senators that the $500,000 increase voted by the House was a significant step in the right direction but falls far short of the amount which currently could be put to sound use. Association representatives planned to detail to the Senators the research projects which the dental schools and other nongovernmental dental research centers would be prepared to undertake if funds could be made available.

The bill voted by the House of Representatives provides a total of $1,300,000 for dental research grants. The White House had recommended $800,000. In toto, the House-passed appropriations bill provides $3,471,000 for all of the dental activities of the U. S. Public Health Service, including the National Institute of Dental Research. The American Dental Association had recommended a total of six million dollars. Funds are for fiscal 1957, which begins July 1.

NIDR Building • Also in the research area, a second Senate committee heard Association testimony. On February 29, Harry Lyons, Association president-elect, headed a delegation of six witnesses who testified to the need of a building for the National Institute of Dental Research. The Subcommittee on Health of the Senate Committee on Labor and Public Welfare was considering S.3246, a bill backed by ten of its 13 members, to increase to five million dollars the authorization for an NIDR building. A similar measure is pending in the House.

Dr. Lyons testified that the NIDR's research program was badly handicapped by the lack of a well housed, well equipped central facility. Appearing with Dr. Lyons were J. Roy Doty, secretary of the Association's Council on Dental Therapeutics; Joseph Volker, dean of the School of Dentistry, University of Alabama; C. Willard Camalier, Association assistant secretary; Mrs. Charles Center of Atlanta, Ga., prominent civic leader, and H. Trendley Dean, secretary of the Association's Council on Dental Research. The group was accompanied by Mr. Bernard J. Conway, secretary of the Council on Legislation.

Support for the Association's position came in March from a committee which has been studying the health research activities of the Department of Health,

Education and Welfare. On March 1, the committee of physicians and scientists, headed by C. N. H. Long, M.D., of the Yale School of Medicine, reported that of the seven National Institutes of Health, only the National Institute of Dental Research and the Institute of Allergy and Infectious Diseases had insufficient funds and facilities.

The committee said that the most acute need in dental research is for the development of additional qualified personnel, but stated also that "the Institute for Dental Research needs better facilities and more money for its operation." The committee had been appointed by the National Science Foundation at the request of the Health, Education and Welfare department.

Additional support to the Association's campaign for increased research came from the nation's press. Newspapers across the country plugged the need for dental research in news items and editorials.

Military Medicine • On March 2 the House of Representatives passed two military bills. It sent to the Senate H.R. 9428, the career incentive bill, and H.R. 9429, the military dependents' care bill.

Under the career incentive bill, the current $100 special bonus will continue to be paid to physicians and dentists, with additional amounts paid after three years of service. Including the increase, the total bonus will be $150 a month after three years of service, $200 a month after six years and $250 a month after ten years.

The bill provides also that time spent in medical or dental school and time spent in medical, but not dental, internship shall count as military service for purposes of pay and promotion. This provision is expected to mean increases in pay of about $50 a month. Except for the failure to include dental internship as service credit, the bill follows Association recommendations.

The military dependents' care bill provides for a government paid health insurance plan under which servicemen's families have the choice of private care or care in military facilities. Under present law, dependents of servicemen are entitled to free care only when military facilities are available. The Secretary of Defense will now have to work out a health insurance plan either with commercial companies or with nonprofit services such as Blue Cross and Blue Shield.

Dental care under the House-passed measure is limited to emergency treatment except in overseas areas and certain remote areas in the United States. In these areas a fuller measure of care is authorized, to be rendered in military facilities and subject to the availability of staff.

IDAHO BECOMES 30th STATE TO ACCEPT NATIONAL BOARDS

Idaho has become the 30th state to accept the grades of the National Board of Dental Examiners in partial fulfillment of licensure requirements. Late in February, Adrian G. DeWinter, secretary of the Idaho State Board of Dental Examiners, announced that the acceptance of the national board scores will be effective for Idaho's next state board dental examinations scheduled for June.

ANNUAL SESSION HOUSING BUREAU OPENED APRIL 1

The Housing Bureau for the American Dental Association's October 1-4 annual session in Atlantic City, N. J., opened April 1. All reservations for housing must be made through the Bureau, it has been announced. An application may be found on page A-40 of this issue of THE JOURNAL.

Official hotels for the 97th annual session are Chalfonte—Haddon Hall and Claridge Hotel. The Board of Trustees and the district delegations will meet at

Haddon Hall; the House of Delegates and the Reference Committees on the second floor of the Auditorium. Some 30 groups in the dental field have already scheduled preconvention meetings.

At the same time that preparations were moving ahead for the annual session, a reminder was issued that June 30 is the deadline by which applications for life membership must be received in the Association's Central Office. Louis M. Cruttenden, Association assistant secretary, announced that according to the *Bylaws* applications must be received by the June 30th date in order to be voted on at the annual session.

BERMUDA DENTAL CONFERENCE TO FOLLOW ANNUAL SESSION

A mid-Atlantic dental conference immediately following the 1956 annual session of the American Dental Association is being sponsored by the Bermuda Dental Association. Dates for the mid-Atlantic meeting are October 7-10.

The dental society plans both a scientific and social program. Trips to the gulf stream island will leave from Atlantic City, N. J., October 5; three different trips are offered. Reservations for the conference may be made through the conference coordinators, Lee Kirkland Travel, 1231 Baltimore Ave., Kansas City, Mo.

PROPOSE NEW NAME AND MORE COURSES FOR TECHNICIANS

An increase in the number of college-level training programs for dental laboratory technicians plus a new name for the technicians were two of the recommendations made by a three-day workshop held March 5-7 in Chicago. The meeting was sponsored by the American Dental Association's Council on Dental Education and Council on Dental Trade and Laboratory Relations. Some 65 representatives of the dental profession and the laboratory industry participated.

Presiding was Willard C. Fleming, dean of the University of California Dental School and chairman of the Council on Dental Education's committee on the training of dental laboratory technicians.

Conference participants agreed that the present two year college-level course for technicians was needed to assure the highest type of laboratory service. They stressed the importance of such programs being conducted under the auspices of educational institutions. In addition, they recommended that the study of orthodontic appliances, special appliances and ceramics be eliminated from the regular program and be made part of advanced courses.

In attempting a definition of the technician, the conference proposed that the term "dental laboratory technologist" be applied to the individual capable of interpreting and fulfilling the dental authorization and directions in any laboratory technic and that the term "technician" apply to the person trained to perform only a few phases of the process.

The workshop's recommendations will be considered at meetings of the two Association councils later this year.

BERT HOOPER HEADS COUNCIL ON DENTAL EDUCATION

Bert L. Hooper, dean of the College of Dentistry of the University of Nebraska in Lincoln and a member of the Association's Council on Dental Education, has been appointed Council chairman. He succeeds Gerald D. Timmons, who resigned from the Council last October on election to the post of Speaker of the Association's House of Delegates. Named as a Council member to fill the vacancy created by Dr. Timmon's resignation was Maynard K. Hine, dean of the School of Dentistry of Indiana University in Indianapolis. Both appointments, which terminate at the 1956 annual session, were made by Bernerd C. Kingsbury, Association president.

Dean Fleming addresses the workshop.

Among participants in the recent workshop on the training of dental laboratory technicians were (l. to r., above): Paul Slone, executive secretary, National Association of Dental Laboratories; Willard C. Fleming, dean, College of Dentistry, University of California; Harold Hillenbrand, Association secretary, Walter E. Dundon, chairman, Council on Dental Trade and Laboratory Relations, and Shailer Peterson, secretary, Council on Dental Education.

Below: Additional participants were (l. to r.): Mr. George W. Barnhart, dental laboratory technician at Zoller Clinic, University of Chicago; Mr. Herman Wald, director of the dental technicians program, New York City Community College of Applied Arts and Sciences; A. Raymond Baralt, dean of the Chicago College of Dental Surgery, Loyola University (Chicago); Mr. Paul Stough, chairman, NADL education committee, and Joseph E. Kennedy, chairman, NADL professional relations committee.

RELIEF FUND NEARS $110,000; PASSES LAST YEAR'S MARK

Contributions to the 1955-56 Relief Fund campaign were $109,430.58 on March 15, an amount nearly $10,000 over the campaign goal. Contributions were running ahead of last year and were within $1,800 of the total collected when last year's fund drive ended June 30. As of March 12, the last date for which a breakdown of contributions was available, 41 states and the U. S. Public Health Service had topped their quotas.

DENTISTRY ASKED TO HELP IN TEST OF EMERGENCY HOSPITAL

The American Dental Association has been invited to send a representative to the April 10-12 test of the Federal Civil Defense Administration emergency hospital unit. The testing will take place at Fort George G. Meade in Maryland.

The 200 bed Civil Defense emergency hospital has been designed to be put into use quickly in the event of national disaster. The test will simulate the conditions under which the hospital would have to operate. Analysis teams composed of representatives from various organizations in the health field will evaluate the test results so that basic procedures, staffing and organizational patterns may be developed for operating such an emergency hospital.

TV SPOT ANNOUNCEMENTS PRODUCED BY ASSOCIATION

The American Dental Association has produced three 20-second television spot announcements presenting dental health messages for use by state and local dental societies. Each of the films, designed for year-round use, highlights a phase of home dental care.

The subjects are toothbrushing, foods and dental health and early dental care. Copies of the films may be rented from the Film Library or purchased from the Order Department at the Central Office. The purchase price is $10 for a single film; $25 for the set of three.

TOPICAL-DOSAGE PENICILLIN PRODUCTS DROPPED FROM A.D.R.

The Council on Dental Therapeutics at its February 16 and 17 meeting in the Central Office voted to drop all topical-dosage forms of penicillin from *Accepted Dental Remedies*, the Council's yearly publication of commercial therapeutic products which are of demonstrated usefulness in dental practice. Deleted will be all brands of penicillin troches, ointments, pastes, cones and powders used for topical application.

Although these products have been useful as adjuncts in treating superficial oral infections, the Council said, they have a high "sensitizing potential" because of their use in prolonged contact with the oral tissues. When penicillin must be administered systemically to individuals previously sensitized by local applications, there is a possibility of severe reactions, it was pointed out. Other antibiotics, without a sensitizing effect, are available for local application to oral tissues, the Council stated.

DENTISTS IN 67 COUNTRIES READ DENTAL ABSTRACTS

Dentists from 67 countries abroad plus dentists from every state in the Union as well as in every United States possession now read DENTAL ABSTRACTS. A report on the distribution and number of subscriptions to the Association's latest publication was issued March 15.

On that date DENTAL ABSTRACTS had 7,961 paid subscribers in the United States, 75 in U. S. territories, possessions and dependencies and 692 in other countries, for a total of 8,728 subscribers.

The State of New York led with 1,378 subscribers, followed by California with 1,098 and Illinois with 502. Of the

countries outside the United States, Canada led with 107 subscribers, followed by Australia with 81, England with 57 and Sweden with 43. The complete geographical breakdown of subscribers follows:

United States

Ala.	69	Neb.	63
Ariz.	53	Nev.	16
Ark.	31	N. H.	30
Calif.	1,098	N. J.	384
Colo.	86	N. Mex.	37
Conn.	144	N. Y.	1,378
Del.	22	N. C.	111
Dist. of Col.	95	N. D.	16
Fla.	190	Ohio	319
Ga.	107	Okla.	71
Idaho	22	Ore.	117
Ill.	502	Pa.	452
Ind.	133	R. I.	53
Iowa	94	S. C.	31
Kan.	75	S. D.	27
Ky.	58	Tenn.	89
La.	71	Texas	255
Maine	30	Utah	39
Md.	142	Vt.	13
Mass.	284	Va.	137
Mich.	299	Wash.	174
Minn.	152	W. Va.	46
Miss.	41	Wis.	131
Mo.	126	Wyo.	17
Mont.	31		

Territories, Possessions, Dependencies

Alaska	6	Hawaii	47
Canal Zone	3	Puerto Rico	19

Other Countries

Argentina	12	Ecuador	2
Aruba (Netherlands W. Indies)	2	Egypt	3
Australia	81	England	57
Austria	2	Fiji Is.	1
Belg. Congo	1	Finland	10
Bahrein (Island in Persian Gulf)	1	France	26
Belgium	4	Germany	11
Brazil	20	Greece	10
Br. W. Indies	10	Guatemala	3
Bulgaria	1	Hong Kong	4
Canada	107	Iceland	1
Costa Rica	3	India	7
Ceylon	1	Indonesia	1
Chile	3	Iran	1
Colombia	11	Ireland	2
Cuba	11	Israel	13
Cyprus	2	Italy	21
Czech.	1	Japan	31
Denmark	13	Kenya	1
Mexico	12	Lebanon	4
Monaco	1	Malaya	3
Morocco	3	Salvador	2
Netherlands	14	Scotland	7
New Zea.	22	Spain	5
Norway	11	Sweden	43
Panama	3	Switzerland	11
Paraguay	2	Thailand	2
Peru	5	Tasmania	1
Philippines	14	Turkey	2
Portugal	1	Uganda	1
S. Rhodesia	1	Uruguay	2
U.S.S.R.	1	U. So. Africa	19
Ryuku Is.	1	Venezuela	7
		Yugoslavia	1

EDUCATIONAL MEASUREMENTS DIVISION DIRECTOR NAMED

Mrs. Grace Parkin of Chicago has been appointed director of the Division of Educational Measurements of the Council on Dental Education, announces Harold Hillenbrand, Association secretary. Mrs. Parkin's appointment was effective March 5. The Division is concerned mainly with the dental aptitude testing program and is responsible for the publication of such brochures and bulletins as the *Dental Students' Register*, the aptitude testing brochure and the surveys and questionnaires of the Council on Dental Education.

Prior to the appointment as Division director, Mrs. Parkin was employment manager for American Maize-Products Co., of Roby, Ind., a post she held for ten years. She has worked previously in the education field as instructor in the

Grace Parkin

engineering training department of the Pratt-Whitney division of United Aircraft Corporation.

Mrs. Parkin holds a bachelor of arts degree in mathematics and a bachelor of science degree in engineering from the University of Illinois.

YEAR-END INDEX TO DENTAL LITERATURE NOW READY

The 1955 bound volume of the *Index to Dental Literature* is now ready, according to Donald Washburn, director of the Bureau of Library and Indexing Service. The 1955 *Index* contains 10,191 entries for 5,303 articles compiled from the English dental literature.

Included in the total number of entries are scientific articles, book reviews, obituaries and editorials. Some 160 publications including nearly 150 English language periodicals published in the United States and abroad were indexed last year. In addition, 45 dental books published in 1955 are listed in the front of the volume.

The 1955 bound volume may be obtained from the Subscription Department at the Central Office for $10. For the 1956 *Index* published quarterly and including the 1956 bound volume, the subscription price is $20.

HERBERT E. PHILLIPS, FORMER ASSOCIATION OFFICIAL, DIES

Herbert E. Phillips, former Association representative on the Committee on the Cost of Medical and Dental Care, died March 11 in Chicago. He was 81 years old. The studies made by the Committee, which was established in 1928, were the first of their kind ever to be made in the medical and dental field.

The Committee's aim was to collect data to present to the health professions and to the public which could form the basis for improved health care. It investigated the incidence of disease, the facilities available to provide medical and dental care, the cost of existing services, incomes of physicians and dentists, and the kinds of organizations providing care.

The Carnegie Foundation, the Milbank Memorial Fund, the Russell Sage Foundation and the Twentieth Century Fund helped support the studies. The American Medical Association and the American Dental Association also supplied money and had representatives on the Committee. Dr. Phillips was chairman of the dental committee. Serving with him were C. E. Rudolph of Minneapolis, an Association Trustee, and Arthur D. Black of Chicago.

J. HOWARD BROWN, FORMER COUNCIL MEMBER, DIES AT 71

J. Howard Brown, Ph.D., Sc.D., a former member of the Association's Council on Dental Therapeutics, died in Baltimore February 9. He was 71 years old. A ranking figure in various medical research programs, Dr. Brown devoted much of his research to a study of streptococci.

SUBSCRIPTS • The first accidental death claim under the new American Dental Association's insurance program was paid recently. A dentist slipped on his kitchen floor, fractured his skull and died. The amount paid was $20,000. . . . The State Secretaries Management Conference June 4-6 will be one of the first large meetings to be held in the remodeled board room in the Central Office. . . . H. Trendley Dean, secretary of the Council on Dental Research, was honored March 21 by the Madison County and St. Clair District Dental Societies (Ill.) for his work in fluoridation research. Dr. Dean was born in St. Clair County. . . . The series of slides, S 15 *Occlusion and Malocclusion* may be rented from the Film Library for $1.50 and may be purchased from the Order Department for $29.20. The series includes 27 color and four black and white slides.

Dental Societies

BERNERD KINGSBURY BANQUET SPEAKER IN PUERTO RICO

Bernerd C. Kingsbury, president of the American Dental Association, addressed the presidential banquet of the Colegio Cirujanos Dentistas during the society's recent annual session. Some 80 per cent of the membership attended the convention, to make the 1956 meeting the largest in the society's history.

Elected officers were Manuel A. Rosso, president; Reinaldo Carrasquillo, president-elect; Marcos A. Dones, vice-president; and Reinaldo Gonzalez Ramos, treasurer. Selected for the post of auditor was Jose V. Arenas. Jorge E. Munoz was chosen secretary. The secretary's post will be filled temporarily by Dr. Carrasquillo as Dr. Munoz is ill.

Among essayists and clinicians were Gerald D. Timmons of Philadelphia, American Dental Association Speaker of the House; Edward R. White of Jersey City, Fourth District Trustee; Samuel C. Miller and Stanley J. Behrman of New York; R. P. Gingrass of Milwaukee and E. T. Lewis of Pittsburgh. Also on the program were Harry J. Healey of Indianapolis, Joseph C. Biddix of Baltimore and Irving Feldman of Roxbury, Mass.

ARKANSAS HEALTH COMMITTEE STRESSES TOTAL HEALTH

The newer concept of the "total child" as a human being with physical, emotional, social and moral aspects rather than simply a physical entity, involves the entire community in his well-being. This is the conclusion of the Arkansas Joint Committee on School Health, a committee composed of representatives of the State Board of Health, the State Department of Education, the medical and dental professions.

The committee appeared before the 83rd annual meeting of the American Public Health Association in Kansas City, Mo., last November to explain its program to other health groups. Included in its presentation was an exhibit pre-

Bernerd C. Kingsbury (second from left), president of the American Dental Association, addressed the presidential banquet of the Colegio de Cirujanos Dentistes of Puerto Rico January 28. At the speakers' table with Dr. Kingsbury are (l. to r.) Mrs. Fernando Ordoñez; Fernando Ordoñez, immediate past president of the Puerto Rican society; Mrs. Kingsbury; Manuel A. Rosso, president, and Miss Norma Trides.

The "grandfather" of Children's Dental Health Day, E. L. Pettibone (center), was honored February 6 by the Cleveland Dental Society. A pioneer in dental health education, he was recognized for his 50 years in dentistry. With him are (l. to r.) P. J. Warren, toastmaster, and D. R. Kinsley, society president.

Dental health is related to total health in this exhibit of the Arkansas Joint Committee on School Health at the American Public Health Association convention in Kansas City, Mo., last November. The state dental association helped prepare the exhibit.

Increased research funds needed to improve the nation's dental health were voted recently by a House subcommittee headed by Congressman John E. Fogarty. Congressman Fogarty's "distinguished and enlightened leadership" was recognized by the Rhode Island State Dental Society, which last January awarded him its Gold Medal for "distinguished and enlightened leadership." Left to right are: Edward L. Bessette, the society's immediate past president; Michael B. Messore, also a past president; Congressman Fogarty; Harold Hillenbrand, American Dental Association secretary, and Nicholas G. Migliaccio, society president.

pared in part by the Arkansas State Dental Association showing the contribution to dental health which has resulted from the interprofessional approach of the joint committee.

Part of the school health program is recognition of a school excuse slip for dental appointments, observation in the schools of National Children's Dental Health Week, the mailing to school administrators of a dental resolution opposing the sale of confections in the schools and cooperation in dental health conferences.

GRANDFATHER OF HEALTH DAY CITED BY CLEVELAND SOCIETY

E. L. Pettibone, veteran Cleveland dentist who is known as the "grandfather" of the idea of Children's Dental Health Day, was honored February 6. The Cleveland Dental Society, during its annual Children's Dental Health Day meeting, presented Dr. Pettibone with a hand-illuminated scroll. Dr. Pettibone this year marks his 50th year in dentistry.

Early in his career, he was president of the Cleveland Dental Society. Later he became president of the Ohio State Dental Association. In the 1920's and the 1930's Dr. Pettibone served the American Dental Association as chairman of the Section on Mouth Hygiene and Preventive Dentistry, as vice-chairman of the Mouth Hygiene and Public Instruction Committee and as chairman of health exhibits. Today, at 79, he maintains an active dental practice as well as an interest in civic affairs.

Dental Education

PROSTHETIC REHABILITATION IS SYMPOSIUM SUBJECT

A symposium on prosthetic rehabilitation of the patient after maxillofacial surgery will be held April 11 in Indianapolis under the joint sponsorship of the Indiana Cancer Society and the Indiana University School of Dentistry. Dental and medical men on the program will discuss appliances needed after surgical treatment, including maxillectomy and mandibulectomy, and protective and application devices used in radiation therapy. Also on the agenda are discussions of the nature of neoplastic diseases of the face and oral cavity from the pathologist's viewpoint and a functional study of the tongue and velo-pharyngeal musculature.

Symposium participants include William G. Shafer, assistant professor, department of oral pathology at the dental school; Frank Vellios, M.D., associate professor of pathology, Indiana University School of Medicine; Thomas B. Bauer, M.D., and John M. Tondra, M.D., of the medical school's section of plastic surgery. Additional speakers are David C. Gastineau, M.D., professor of radiology in the medical school, and Benjamin M. Hoffman, maxillofacial prosthodontist, Veteran's Administration Hospital, New York.

KANSAS ALUMNI ELECT DEAN RINEHART MAN OF THE YEAR

Roy J. Rinehart, dean of the University of Kansas City School of Dentistry in Kansas City, Mo., has been elected "Man of the Year" by the school's alumni association. The school this year is celebrating its Diamond Jubilee. This year marks also Dean Rinehart's 54th year in dentistry and his 45th year in dental education.

In 1916 Dean Rinehart took on the task of keeping the Western Dental College from closing. Three years later he was instrumental in affecting the merger of the College with Kansas City Dental College. A modern building was erected through his efforts.

In 1926 Dean Rinehart extended his interest in education beyond the dental field. As a result of his work, the University of Kansas City was organized, and in 1953 he served as its acting president.

Dean Rinehart's accomplishments have been recorded in *Who's Who in America, Who's Who in American Education, American Men of Science* and *World Biography.*

WASHINGTON UNIVERSITY HONORS ST. LOUIS DENTIST

J. Floyd Alcorn, prominent St. Louis dentist, was one of 14 alumni to receive Washington University's Alumni Citation at the University Founders' Day assembly February 23. The award was presented "in recognition of outstanding achievements and services which have reflected honor upon the University." Active in the affairs of organized dentistry, Dr. Alcorn has served as president of the St. Louis Dental Society, the Washington University Dental School Alumni Association and as chairman of the committee on dental health of the Missouri State Dental Association. He is editor of the state group's journal and a delegate to the American Dental Association's House of Delegations. Dr. Alcorn is a Fellow of the International College of Dentists.

SPRING AND SUMMER CLASSES INCLUDE REFRESHER COURSES

California • A refresher course in clinical diagnosis in dental medicine is offered by the University of California College of Dentistry in San Francisco. The class, taught by Hermann Becks, M.D., D.D.S., is scheduled for May 5 and 6. The subject matter will be illustrated by motion pictures and slides.

Columbia • Principles of occlusion will be taught by Columbia University School of Dental and Oral Surgery in New York May 16-18. The course, which consists of lectures, seminars, group discussion and clinical demonstrations, is designed to correlate the principles of occlusion to clinical criteria and therapeutic aims. Lewis Fox is instructor.

Pittsburgh • Dates of refresher courses offered by the School of Dentistry of the University of Pittsburgh and the Odontological Society have been announced. Pedodontics, anesthesia, oral surgery, prosthesis, head and neck anatomy and periodontics courses are scheduled for Wednesday evenings April 4 through May 9. Classes in oral roentgenology and in air abrasive operative technics will be Wednesday evenings, April 4-25. Those interested in making special arrangements for studying crown and bridge procedures under supervision on a refresher basis may write to the chairman of the postgraduate committee, Odontological Society, 206 Jenkins Bldg., Pittsburgh.

Washington (St. Louis) • Washington University School of Dentistry in St. Louis announces two courses for general practitioners: occlusal equilibration, May 7-9, and oral surgery, May 21-25. Harold Schreiber of the school staff will direct the course in occlusal equilibration which will include lectures on theory and technic, occlusal equilibration on models and patients. Members of the oral surgery staff will assist Leroy W. Peterson in the oral surgery course.

Washington (Seattle) • Developmental problems of the deciduous and mixed dentitions will be taught April 30 to May 2 at the University of Washington School of Dentistry in Seattle. The course will cover the management of space after early loss or too long retention of deciduous molars, early loss of permanent teeth, oral habits and their control, opportunities for management of growth problems associated with oral anomalies and the correction of conditions resulting from occlusal interferences and abnormal muscle patterns. Edward A. Cheney of the University of Michigan will teach.

A second course offered by the school is "The Application of High Speeds and Modern Instruments to Restorative Procedures." The course will be given May 15 and 16 by a staff of four. Instructors are Rex Ingraham, Lem V. Sweet, Rene L. Eidson and Francis J. Conley.

TRAIN DENTISTS IN CARE OF CEREBRAL PALSIED

Dentists will be trained to manage the special medico-dental problems which arise in the treatment of children with cerebral palsy under two fellowships established by the Dental Guidance Council for Cerebral Palsy and sponsored by

United Cerebral Palsy of New York City, Inc. The fellowships, to be taken at Columbia University School of Dental and Oral Surgery, carry a stipend of $3,000 to $3,600 a year.

The two year full-time program includes applied basic science courses, medical courses related to cerebral palsy and postgraduate dental courses related to various aspects of pedodontics. In the second year, emphasis is placed on inpatient and outpatient cerebral palsy dental service. Applications for the fellowships should be made to the school in New York no later than the deadline May 18.

National Defense

SOCIETIES ASKED TO SEEK DEFENSE COURSE

Dental societies interested in sending their members to civil defense courses at the Federal Civil Defense Administration staff college in Battle Creek, Mich., should contact Russell W. Bunting, FCDA dental consultant. In a recent communication to the American Dental Association's Subcommittee on Civil Defense, Dr. Bunting urged dentists to take part in the FCDA courses.

"Thus far the FCDA has offered three courses in training for dentists," he said. "They have afforded a large number of dentists the opportunity to learn more about the whole problem of national disaster in the event of a thermonuclear attack and the part that dentists will play in meeting such an emergency.

"Out of these groups have come many individuals who have become active in their immediate locality, in their state or on the national level," Dr. Bunting wrote. "They have stimulated dental societies to take emergency casualty care training and have become key civil defense workers for organized dentistry.

"Each state society should consider this most important project and take necessary action to send representatives to such a course. This is the most effective means of implementing training in all parts of the country," he said.

DENTISTS HAVE MAJOR CIVIL DEFENSE ROLE A.M.A. SAYS

Dentists will have an important role in providing emergency casualty care in any major catastrophe, Harold S. Diehl, chairman of the American Medical Asso-

"Deep appreciation and gratitude for the role [Army dentists] are so ably filling" was expressed in a letter from the Chicago Dental Society to Col. Oscar J. Ogren, Fifth Army dental surgeon. The occasion was the Army Dental Corps' 45th anniversary. Colonel Ogren places the letter on the Dental Corps display at Fifth Army headquarters in Chicago. Looking on is Capt. John Waters, Colonel Ogren's administrative assistant.

Representatives from Ladd and Eielson Air Force Bases in Alaska as well as from Fort Richardson Dental Clinic, Anchorage Native Service Hospital and the Anchorage Dental Society took part in the first Elmendorf Dental Clinic Day February 10.

ciation Council of National Defense, said in a recent statement.

Because of their specialized training and experience, dentists "may be called upon as leaders of whole sections of emergency medical action," he said. "Dentists have an opportunity and an obligation to work with physicians in providing first aid and emergency medical care in the event of an enemy attack or following a national disaster. It is the primary responsibility of each dentist to be trained in all the techniques of emergency lifesaving measures, the extent of which would vary depending upon local medical and health resources and the extent of casualties," he pointed out.

ARMED FORCES USE MANIKIN DEVELOPED BY DENTIST

The Navy Department, the Army and the Air Force recently announced the purchase of 20 Manikins Mark II, the improved version of the Mark I bleeding manikin developed by Capt. John V. Niiranen, DC (USN), at the U. S. Naval Dental School in Bethesda, Md. Cooperating with Captain Niiranen in developing the manikin were William C. Young, exhibits director, Naval Medical School in Bethesda, and Thomas Haynes of Rogay Models, Washington, D. C. The manikin can be fitted with several types of moulages simulating different injuries and is used to teach first aid procedures. A bleeding manikin developed by Captain Niiranen was exhibited at the American Dental Association's annual session in San Francisco last fall and was part of a prize-winning exhibit presented by the Navy Dental Corps illustrating its casualty treatment training program.

ALASKAN AIR FORCE DENTISTS INAUGURATE CLINIC DAY

On February 10 dentists from all over Alaska attended what may turn out to be an annual affair. It was the all-day Dental Clinic sponsored by the dental officers at Elmendorf Air Force Base. The volume of requests was such that the Air Force dental group plans to establish Dental Clinic Day as a regular event, according to Maj. C. O. Dummett (DC) USAF, chairman of the dental seminars.

The February 10 program included six lectures and three clinics, a dinner meeting and address by Brig. Gen. E. Maxwell (MC) USAF. Col. J. O. Mitchell, wing dental surgeon, opened the program.

An additional activity of the Air Force dental group is the publication of a brochure entitled *Help Yourself to Mouth Health*, designed for use by men on the base. The booklet describes proper care of the teeth.

SUBSCRIPTS • The Veterans Administration recently announced that dental service provided veterans in mental hospitals and domiciliary institutions would be evaluated as part of a long range study of treatment patterns in the care of psychiatric patients.

Public Health

NEWTON HOWE NAMED FIRST DENTAL DIRECTOR IN VERMONT

With the appointment of Newton Howe of Fort Collins, Colo., Vermont has its first full-time state dental director. The appointment was announced in February by Francis A. Reid, dental member of the State of Vermont Health Commission. Dr. Howe assumed the post February 6. Establishment of a dental division within the state department of health last year by the Vermont legislature climaxed a 20 year campaign by the state's dentists.

U. S. PUBLIC HEALTH SERVICE TO UPGRADE OFFICERS

The U. S. Public Health Service intends to authorize higher initial appointments in grade for special registrants who desire to enter the Public Health Service, according to a March 16 letter sent the American Dental Association's Council on Federal Dental Services. The upgrading will be effective July 1. The USPHS policy will be identical with that recently announced by the Army, Air Force and Navy, according to John W. Knutson, USPHS chief dental officer.

CIVIL SERVICE SEEKS DENTAL OFFICERS

The U. S. Civil Service Commission has announced an examination for dental officers for positions paying from $5,440 to $10,320 a year. The positions are in federal agencies in Washington, D. C., as well as in field positions with the U. S. Public Health Service throughout the United States and Alaska.

Applicants must be graduates of accredited dental schools and must be licensed to practice dentistry in a state or territory of the United States. In addition, they must have had from one to four years of professional experience. Applications are being accepted by the U. S. Civil Service Commission, Washington 25, D. C. Information and applications may be obtained from post offices.

PHILIP BLACKERBY APPOINTED TO KELLOGG FOUNDATION POST

Philip E. Blackerby, Jr., a member and former chairman of the Association's Council on Dental Education, has been appointed associate general director of the W. K. Kellogg Foundation, according to a recent announcement by Emory Morris, the Foundation's general director. Dr. Blackerby has been director of the Foundation's division of dentistry since 1945. The Foundation, which has been in existence for 25 years, has provided funds for more than 1,500 projects in the health, education and allied fields. Dental education has been among its beneficiaries.

International

AMERICANS MADE HONORARY MEMBERS BY INDIAN GROUP

Eight Americans have been awarded honorary membership in the All India Dental Association, announces Fali S. Mehta, general secretary. Elected "for the conspicuous services that they have rendered to the Association and to the dental profession at large," they are among the 14 persons so honored to date by the Indian organization.

The Americans are: C. D. Marshall-Day, dean, Tufts College Dental School: Daniel F. Tobin, director, Murry and

The Australian Department of Health maintains a Bureau of Dental Standards with a program similar to that of the American Dental Association at the National Bureau of Standards in Washington, D. C. Work in dental materials is being carried on by (standing, l. to r.): Maxwell P. Chong, Victor G. McLaverty, Albert L. Ware and Jack R. Griffith; seated: Friedl Lippmann, Alan R. Docking and Joan A. Donnison.

Leonie Guggenheim Dental Clinic; Charles E. Hatch, acting director, Forsyth Dental Infirmary for Children; Basil Bibby, director, Eastman Dental Dispensary in Rochester, N. Y.; Isaac Schour, dean, College of Dentistry, University of Illinois; Harold Hillenbrand, secretary, American Dental Association, and John W. Knutson, chief dental officer, World Health Organization.

U. S. DENTISTS INVITED TO JOIN INTERNATIONAL GROUP

American dentists have been invited to join the Fédération Dentaire Internationale, the only international organization in the dental field. In issuing the invitation, Obed H. Moen, U. S. treasurer for the F.D.I., stated, "Dentistry needs to establish itself on an international level. Support of the Fédération will be in keeping with the tradition of leadership of the dental profession in the United States."

The membership drive is supported by the American Dental Association. Annual dues in the F.D.I. are $10. A membership card, a subscription to the *International Dental Journal*, a quarterly *News Letter* and reduced fees for international meetings are benefits of membership. The 1956 annual meeting of the F.D.I. will be May 28 to June 3 in Zurich. Switzerland. In 1957, the organization will hold a Dental Congress in Rome.

Memberships may be obtained from Dr. Moen, 6 Main St., Watertown, Wis.

SUBSCRIPTS • Three dentists were included in Great Britain's New Year Honours List. They were John Hall-Best of Australia, past president of the Aus-

tralian Dental Association; Maj. Gen. D. J. Muil, O.B.E., Q.H.D.S., director of the Army Dental Service, and Frederick J. Ballard, honored for his work as senior treasurer of the Dental Board. . . . The Canadian Dental Association will hold its 1956 convention June 3-6 at Banff, Alberta. . . . July 10-13 are the dates of the annual meeting of the American Dental Society of Europe. The group meets at the Royal College of Surgeons in London. . . . A new secretary general has been named for the 12th International Dental Congress to be held in 1957 in Rome. He is Pio Lalli who replaces Nino Corradi. Dr. Corradi resigned from the position recently because of ill health.

General

INDUSTRIAL DENTISTS MEET IN PHILADELPHIA IN APRIL

A symposium on the impact of industrial dental programs on local dental practice is a feature of the April 24-26 meeting of the American Association of Industrial Dentists. The meeting, which is being held in conjunction with the 1956 Industrial Health Conference, is scheduled for Philadelphia's Convention Hall.

Symposium speakers are Edward R. Aston of Harrisburg, Pa.; H. H. Dougherty of Wyomissing, Pa.; Aaron Finkelman of Philadelphia; C. R. Fricke of Etna, Pa., and Guy C. Kirby of East Hartford, Conn. A discussion period will follow the symposium.

Other topics on the industrial dentists' agenda are the role of dentistry in a comprehensive prepaid union health program, interpretation of dental and other observations in lead workers and the role of dentistry in a comprehensive prepaid union health program. A tour of the Sidney Hillman Medical Center is planned also.

TWO DEANS ELECTED TO GENERAL DENTISTRY ACADEMY

Maynard K. Hine, dean of the School of Dentistry, Indiana University, and Harold J. Noyes, dean of the Dental School, University of Oregon, were elected honorary members of the Academy of General Dentistry at its third annual meeting February 5-7 in Chicago. Dr. Hine, in accepting his membership, spoke of the danger of fragmentation of the profession. Secretary of the Academy of General Dentistry is Alfred Knab of Chicago.

Robert N. Phillips (second from left), a 1955 graduate of Ohio State University College of Dentistry and an intern at the U. S. Public Health Service Hospital in Brighton, Mass., won a $500 first prize in a recent essay contest conducted by the American Denture Society. The society conducts the contest annually among senior dental students. With Dr. Phillips are (l. to r.): Daniel Holland, president-elect of the Massachusetts Dental Society, Capt. John A. Hammer, chief of the dental service at the USPHS Brighton hospital, and John R. Wallace, president of the American Denture Society.

A four-color poster reading "Play Safe . . . See Your Dentist Twice a Year!" will be carried on more than 2,500 delivery vehicles of the Linen Supply Association of America, the national trade group for 1,115 linen and towel suppliers and allied firms. The trucks cover nearly every city in the United States and Canada, the company states.

COMMISSION ON CHRONIC ILLNESS CEASES OPERATION

The Commission on Chronic Illness held its last meeting as an independent national health agency in New York in February. With the end of its operations, further work in chronic illness will be carried on by the former member organizations, which include the American Dental Association. The Commission was founded in 1949 as a temporary organization by the American Hospital Association, American Medical Association, American Public Health Association and American Public Welfare Association to make a study of the problems of chronic disease, illness and disability. Responsibility for publication of the Commission's *Chronic Illness News Letter* has been assumed by the A.M.A. Council on Medical Service. It will be published bimonthly for the first year.

JOSEPH CONLON HEADS ORAL SURGEONS' SOCIETY

Elected president of the Middle Atlantic Society of Oral Surgeons at its recent meeting in Baltimore was Joseph F. Conlon of Washington, D. C. Frank N. Carroll of Wheeling, W. Va., was chosen president-elect. Also elected were Lloyd E. Church of Bethesda, Md., vice-president, and Edward C. Armbrecht of Wheeling, W. Va., secretary-treasurer. The next meeting of the society will be April 18 in Washington, D. C. States covered by the Middle Atlantic Society are Maryland, Pennsylvania, Virginia, West Virginia and the District of Columbia.

Also • Articles on dentistry appeared recently in three national magazines. The February 5 issue of *The American Weekly*, Sunday newspaper supplement, carried an article entitled "Beware the Dental Racketeers!" The March issue of *Coronet* contained a piece called "Beware of Dental Bootleggers." Both articles dealt with the illegal practice of dentistry. *Pageant* magazine in March published an article called "A Dentist Gets Mad" which took issue with the idea that dental disease is inevitable and described methods for care of the teeth. . . . May meetings include the 14th annual meeting of the American Association for Cleft Palate Rehabilitation May 3-5 in Kansas City, Mo., and the 64th Alumni Day of the School of Dentistry, Western Reserve University, May 16 in Cleveland. . . . H. L. Bhatia who for the past three years has been teaching periodontics and conducting research at the Loyola (Chicago) University School of Dentistry, will return to India in July to teach periodontics. . . . A postgraduate seminar on children's dentistry was given by the department of dentistry of Kensington Hospital in Philadelphia February 8. The seminar was sponsored by the Philadelphia County Dental Society.

Book Reviews

BONE AND BONES

By Joseph P. Weinmann, M.D., and Harry Sicher, M.D. Second edition. 508 pages with 302 illustrations. Index. $13.75. St. Louis, C. V. Mosby Co., 1955.

The second edition of this foundation work sets an enviable standard for those who issue "new and improved" versions of their former publications. The magnificent illustrations are in keeping with the scholarly presentation and the comprehensive, well-written text. Although the book is invaluable to specialists in several fields, it is so well written that the dental or medical student, or the student just entering graduate study, can take full advantage of it.

The extensive and well-organized bibliography contains more than 1,000 titles and occupies 40 pages. The bibliography alone is worth the price of the book.

Authors and publishers alike can be proud of the format and the excellence and size of the photomicrographs and the other illustrations. The volume should be in the library of every dentist.

John A. Cameron

THE NATIONAL FORMULARY

Tenth edition. 867 pages. Index. $9. Washington, D. C., American Pharmaceutical Association, 1955.

The *National Formulary (N.F.)* is published at five year intervals. It is a companion book to the *U. S. Pharmacopeia (U.S.P.)* and is edited in much the same style. Both publications contain descriptions of therapeutically valuable drugs and adjunctive substances and much other information. They stress chemical and physical standards. In contrast with the *U.S.P.*, the *N.F.* includes standards for some widely used drugs which are not considered useful by experts generally.

The tenth edition of the *N.F.* gives the principal therapeutic classification for each item listed, suggests a range of dosage and points out the amounts of drug generally present in ready-prepared form. A small manual of suggested antidotes is supplied without extra charge to each purchaser.

Among the new listings of dental interest are acetylsalicylic acid, acetophenetidin and caffeine (APC) tablets and capsules, butethamine hydrochloride and epinephrine injection, and lidocaine hydrochloride injection. Zinc compounds and eugenol cement are back again after having been omitted from the ninth edition. Ammonium acetate solution, alkaline aromatic solution, chloramine-T, codeine sulfate tablets, *N.F.* dentifrice, pentobarbital elixir, parachlorophenol and tragacanth mucilage are only some of many important dental items carried over from the ninth edition. Isoalcoholic elixir, a versatile vehicle for prescribed medication, is another. The structural formulas are much improved over those in the previous edition.

The *N.F.* is becoming more useful to practitioners of dentistry with each new edition because of its increasing amount of therapeutic information.

Donald A. Wallace

PATHOLOGY SEMINARS

By Lawren V. Ackerman, M.D.; Arthur C. Allen, M.D.; J. E. Ash, M.D.; Arthur Purdy Stout, M.D., and Rupert A. Willis, M.D. Edited by Robert S. Haukohl, M.D., and W. A. D. Anderson, M.D. 195 pages with 131 illustrations. Index. $10. St. Louis, C. V. Mosby Co., 1955.

These seminars are chiefly for pathologists and others with a keen interest in pathology and histological diagnosis. Of the five presentations, four deal with various types of tumors and one with the cellular and tissue changes in diseases of the skin.

Each seminar was based originally on a dozen or more carefully chosen stained histological slides of the lesions under discussion. The slides were offered for preliminary study by those who attended and participated in each seminar. This procedure made it possible for them to enter effectively into all the activities of the session.

Of course, in this printed form it is impossible to reproduce entirely the lively interest and intense fascination of such seminars.

However, the excellent reproductions of the sections used and careful editing of the proceedings has made possible the retention of much of the interest and fascination of the original presentation. Seminars like these have become increasingly common in recent years at scientific meetings of pathologists. All the moderators are outstanding authorities in their respective specialties. One of them, Colonel

Ash, formerly of the Armed Services Institute of Pathology, is well known in dental circles. Many of the lesions selected for study come from the region of the head, a good number from the oral and nasal cavities. The subject matter and discussion of the diseases of the skin is worthy of careful study by practitioners, both dental and medical.

E. H. Hatton

THE PEDIATRIC YEARS, A GUIDE IN PEDIATRICS FOR WORKERS IN HEALTH, EDUCATION AND WELFARE

By Louis Spekter, M.D. 734 pages with 21 illustrations. Index. $12.50. Springfield, Ill., Charles C Thomas Co., 1955.

This sourcebook of information for professional workers concerned with children discusses methods of achieving optimal health through growth and development. One section is devoted to growth and development, another to specific care during illness, a third to qualifications of professional workers in child health, the fourth to standards of pediatric services.

The author maintains that the task of caring for children should be handled in an integrated fashion by the health team. Dentists, in particular, in caring for children, should be concerned with their growth and development, with childhood ailments which may be modified by dental treatment, with diseases affecting the mouth, with dental health education.

As an example of the integration of dental with medical knowledge, the author cites the seminars on cerebral palsy in which dentists are now cooperating. Such seminars result in a better understanding of the physical and mental processes that may require dental technics different from those used with healthy children. There is rightful emphasis on the child's response to his environment as a total personality rather than as a collection of discrete segments.

Section I is concerned with prenatal measures to insure healthier infants and healthier mothers. Section II deals with everyday care throughout childhood. Section III deals with the cure of disease and provides information on the special problems of each systemic disorder. The book is an encyclopedia of the current knowledge indispensable for the care and supervision of children. The work is a great credit to both author and publisher and is an invaluable guide to pediatricians, dental practitioners and professional workers.

I. Newton Kugelmass

HUMAN PATHOLOGY

By Howard T. Karsner, M.D., LL.D. Eighth edition. 960 pages with 559 illustrations and 15 color plates. Index. $15. Philadelphia, J. B. Lippincott, 1955.

The fact that eight editions of this standard textbook have appeared in a comparatively short time testifies to its value and popularity and to the fact that the concept of pathology is still undergoing intensive changes.

The work is divided into two main parts: general pathology and regional pathology. It is subdivided into 24 chapters, many of which have been thoroughly revised. Furthermore, new material has been added.

Thomas J. Hill has directed the complete revision of the chapter dealing with dental diseases, and Cmdr. William E. Ludwick (USN) has provided material on dental caries. The author has been aided by many contributors who come in the main from medical fields.

Although the book has been written principally for physicians, dentists and dental students will find it helpful for a quick reference in the spheres of pathogenesis, pathologic anatomy, systematology, diagnosis (including differential diagnosis), complications, course, prognosis and therapy of dental diseases.

Listing the topics discussed cannot convey the immense value of this splendidly written work. The quality and thoroughness of the contents as well as the style of writing are impressive. Paper, typography and the reproduction of the illustrative material are excellent. The red cloth binding is attractive and substantial.

There are about 4,000 entries in the index, sufficient evidence that search for any specific entry will be rewarded. An extensive bibliography accompanies each chapter.

Paul H. Glucksman

LEONARDO THE ANATOMIST

By Elmer Belt, M.D. 76 pages with illustrations. Index. $2. Lawrence, Kansas, The University of Kansas Press, 1955.

Although a relatively small volume, this work presents a fascinating description of how Leonardo da Vinci, because he was a great artist, and had a complete knowledge of mechanics, was able to free himself from the confused teaching of his time and make a tremendous, permanent contribution to the understanding of human anatomy. Little of what he concluded from the detailed autopsies he performed has been found in error, and he

undoubtedly laid the first firm base of anatomical understanding.

Although his observations are accepted casually now, it is easy to imagine that many of them were scorned and rejected in his time as well as for many years afterward. As Dr. Belt states, Leonardo was the first artist known to have advanced beyond the anatomy of flayed bodies. Because of his meticulous attention to detail and the almost microscopic way in which he dissected the body, he was able to identify many structures that had been mysterious. And because of his artistic background, he was able to put those observations on paper as true anatomical portraits.

One finds inspiration in reading this excellent presentation by Dr. Belt, although at the same time it is a humbling experience as one recalls the slap-dash "anatomy" done on the medical school cadaver.

To forestall disbelief that an anatomist of the early sixteenth century could have learned so much, the author has reproduced 12 illustrations by Leonardo which demonstrate his artistic skill and understanding of body functions. These add considerably to the over-all interest of the volume.

William Bolton

CANCER CELLS

By E. V. Cowdry. 677 pages with 137 illustrations. Index. Appendix. $16. Philadelphia, W. B. Saunders Co., 1955.

Large monographs in the biological sciences are a rarity in the modern scientific literature. This paucity reflects the increasing complexity of the disciplines and their related fields. There are, perhaps, in the English-speaking countries, few scientists of sufficient breadth of understanding able or willing to undertake such monographs. It is, therefore, a noteworthy event when a major work of this type is published.

The appearance of E. V. Cowdry's monograph *Cancer Cells* is cause for appreciation since the expanding field covered is still in need of broad synthesis and integration of the diverse materials and data which compose it. A work of this magnitude serves both to summarize current and past data as well as to indicate fruitful paths of future research.

Dr. Cowdry's text attempts to synthesize morphological, cytological, chemical, epidemiological and ecological data. His success is remarkable. To be sure, individual scientists, specializing in particular on more narrow aspects of cancer research (indeed, active research today requires narrowness in this context) may object to, or be irritated by Dr. Cowdry's interpretation of certain data, by his omission of particular pet references (almost unavoidable among the mass of data collated), or by the absence of those platitudinous remarks about cancer which infest much of the literature. All must, however, be grateful for this thoughtful summation of so much material.

The type is clear, the print and format excellent. The book is remarkably free from errors. Many of the illustrations are superb. The monograph is worthy of a place of prominence in the library of every scientist.

Charles E. Wilde, Jr.

TIME TO TELL

By Benno Edward Lischer, D.M.D. 105 pages. $2.50. New York, Vantage Press, Inc., 1955.

In a series of essays and lectures, Dr. Lischer traces dentistry's uphill climb. His efforts, and those of his colleagues, will amaze readers who are unaware of the youthfulness of the science of orthodontics.

Dentistry has been practiced for more than 2,000 years, and yet, before the nineteenth century, there was no really scientific approach to the subject. Then, as the allied sciences of anatomy, biochemistry, biometry and anthropometry were applied to the study of dentistry, it began the rise to its present dignified professional plane.

The dental student can learn much from these pages. For the layman, they will be a revelation and a delight. It would be hard to speak too highly of a book that does so many things so well.

William F. Ford

PARTIAL DENTURES

By John H. Wilson, D.D.Sc. (Syd.). 294 pages with 192 illustrations. Index. 84 shillings. Sydney, Australia, Angus and Robertson, 1955.

The ten chapters in this book deal exclusively with removable partial dentures. The book is well written, easy to read and covers all phases of removable partial denture construction including examination, diagnosis, classification and prognosis.

Although there is little or no new information presented, two chapters are outstanding, especially in a book on removable partial dentures. These are Chapter II, 44 pages, entitled

"Basic Biological and Radiographical Factors;" and Chapter V, 24 pages, entitled, "Occlusion."

The material is logically organized, and technical procedures are explicitly described with a minimum of words.

Numerous and varied designs for removable partial dentures are presented, and their particular mechanical attributes explained. There is, however, a lack of correlation of these designs with specific types of clinical problems. In many instances, the design involves edentulous regions where fixed bridgework might be the treatment of choice. Because of these reasons, the book would hardly be acceptable as a textbook for undergraduate use.

Monte G. Miska

XIV[e] CONGRÉS FRANÇAIS DE STOMATOLOGIE (THE 14TH FRENCH CONGRESS OF STOMATOLOGY)

448 pages with 50 illustrations. Paperbound, 3,000 French francs. Paris, Masson & Cie., 1955.

This book is a compilation of the reports, presentations and discussions given at the fourteenth French Congress of Stomatology which was held in Paris October 3-9, 1955. The congress was divided into general sessions, round table discussions and panel meetings.

The general sessions considered such subjects as "The osteosynthesis in treatment of mandibular fractures" (H. Cadenet, J. Chemin and L. Grellet) and "The role of pain in dentistry" (R. Bataille, Ch. Descrozailles and A. Mugnier). The main topic of the round table discussion was: "The 'Squeletée' prosthesis: its esthetic, functional and prophylactic value" (L. Boutroux, G. Ovazza and C. Schuhmann). "The possibilities and limitations of orthodontic therapy" was the main subject discussed at the panel meeting. The panelists were Drs. Caihépé, Fieux and Coutant.

Unquestionably, this book is a valuable contribution to dental literature. A complete understanding of the French language is not necessary to enjoy it because its main value lies in its easily understood tables and excellent illustrations. The bibliography, accompanying each report, completely covers existing literature, including recent European and American contributions.

Typography, illustrations and paper are of excellent quality. The binding, however, is substandard.

Paul H. Glucksman

PRACTICE ADMINISTRATION FOR THE DENTIST

Edited by William R. Mann, D.D.S., and Kenneth A. Easlick, D.D.S. 386 pages with 10 charts. Index. Appendix. $8.50. St. Louis, C. V. Mosby Co., 1955.

This book contains an account of the Michigan Workshop on Practice Administration held at Ann Arbor in September 1953. The editors have, with strict fidelity, presented the collection of papers, discussion of papers and the answers to several hundred questions prepared by eight committees which evaluated the results of an intensive study of practice administration. This study provides the fundamentals necessary for the efficient, ethical practice of dentistry, for professional improvement and for participation in community life—a long uncharted area of professional concern.

Fifty-eight pages are devoted under Chapter 1 to professional ethics and community responsibility. Chapters follow on a survey of the problems of providing more dental care, organizing a new practice, auxiliary personnel, costs and establishment of dental fees, accounting methods and routine of the office in dental practice, methods of payment of dental fees and education of the patient. The book concludes with the appendix quoting the *Principles of Ethics* of the American Dental Association.

The editors have presented their material logically, have substantiated all points and have a style of writing which contributes to easy readability. Type face, format and binding are in excellent taste.

The book is recommended most heartily.

Lloyd H. Dodd

ADVANCES IN EXPERIMENTAL CARIES RESEARCH

Edited by Reidar F. Sognnaes. 236 pages with 48 illustrations and 56 tables. Index. Appendix. $6.75. Washington, D. C., American Association for the Advancement of Science, 1955.

This monograph is a compact review of the extensive studies on the etiology and prevention of dental caries in test animals. It is based on a symposium presented at the 1953 annual meeting of the American Association for the Advancement of Science.

Twenty scientists representing dentistry, anatomy, pathology, bacteriology, zoology, chemistry and nutrition contributed to the monograph. Their comprehensive coverage and

concise analysis of animal experimentation has permitted the organization of the material into 11 chapters. These chapters include the methods of measuring and evaluating the production of dental caries in experimental animals, the location of the carious lesions, genetic and developmental factors, dietary, salivary and endocrine influences, intraoral and environmental factors and the effect of antibiotics and other agents on experimental caries.

Each chapter closes with a concise summary of the material covered and most include an extensive bibliography. The text is factual and free of bias. It will be of particular interest and assistance to students of the caries problem and to those who are directing or contemplating the initiation of a caries research project.

The book is neatly bound, the type excellent and the illustrations clear. Numerous graphs and tables help the reader to visualize the data.

Robert G. Kesel

THE CAPSULAR LIGAMENTS OF THE TEMPOROMANDIBULAR JOINT AND RETRUSION FACETS OF THE DENTITION IN RELATIONSHIP TO MANDIBULAR MOVEMENTS

By Thor Årstad, D.D.S. 95 pages with 38 illustrations. No price listed. Oslo, Norway, A. W. Brøggers Boktrykkeri A/S, 1954.

This small book deals with a large subject—occlusion and jaw relationships. Practically the entire treatise is built around tooth and jaw movement, using the two starting points, centric occlusion of the natural teeth and the centric maxillary-mandibular relationship.

The author has handled a rather technical study well and makes use of a complete and excellent bibliography.

There is adequate differentiation between his definition of centric occlusion of the teeth and the definition of centric jaw relation. There is good evidence to support the current belief that usually it is possible for natural teeth to assume easily a position posterior to that of the centric occlusion.

Adequate attention is given to the consideration of the function of certain ligaments associated with the temporomandibular articulation.

With the present deserved interest in the study of occlusion of natural teeth and the necessary influence of jaw relationship on occlusion, this work should be of special interest to the dental teacher of clinical procedure. It should appeal to the close student of masticatory function much more than to the casual reader in dental literature.

James H. Pearce

BOOKS RECEIVED BUT NOT REVIEWED

ANCIENT THERAPEUTIC ARTS: THE FITZPATRICK LECTURES DELIVERED IN 1950 AND 1951 AT THE ROYAL COLLEGE OF PHYSICIANS • By William Brockbank, M.D. 162 pages with illustrations. $5. Charles C Thomas, 301 E. Lawrence Ave., Springfield, Ill., 1955.

DIE FOKALLEHRE • By Dr. Med. D. Brück. 191 pages with illustrations. Dr. Alfred Hüthig, Verlag, Heidelberg, Germany, 1951.

PRESENT-DAY PSYCHOLOGY: AN ORIGINAL SURVEY OF DEPARTMENTS, BRANCHES, METHODS, AND PHASES, INCLUDING CLINICAL AND DYNAMIC PSYCHOLOGY • Edited by A. A. Roback. 995 pages with illustrations. $12. Philosophical Library, Inc., 15 E. 40th St., New York, 1955.

DIE DENTALE RÖNTGENDIAGNOSTIK UND IHRE KLINISCHE AUSWERTUNG • By H. Schwarzkopf. 304 pages with illustrations. Dr. Alfred Hüthig, Verlag, Heidelberg, Germany, 1950.

CLASSICS OF BIOLOGY • By August Pi Suñer. Authorized English translation by Charles M. Stern. 337 pages. $7.50. Philosophical Library, Inc., 15 E. 40th St., New York, 1955.

HYPNOTIC SUGGESTION: ITS ROLE IN PSYCHONEUROTIC AND PSYCHOSOMATIC DISORDERS • By S. J. Van Pelt, M.B., B.S. 95 pages. $2.75. Philosophical Library, Inc., 15 E. 40th St., New York, 1955.

SECURITY FOR ALL AND FREE ENTERPRISE: A SUMMARY OF THE SOCIAL PHILOSOPHY OF JOSEF POPPER-LYNKEUS • Edited by Henry I. Wachtel. 162 pages with illustrations. $3. Philosophical Library, Inc., 15 E. 40th St., New York, 1955.

OFFICE PROCEDURES • By Paul Williamson, M.D. 412 pages with illustrations. $12.50. W. B. Saunders Co., West Washington Square, Philadelphia, 1955.

Current Literature

THUMB SUCKING: THE ORTHODONTIST'S VIEW

James M. Jolly. Washington Univ. D. J. 1:22 Nov. 1955.

Thumbsucking is a significant factor in malocclusion and as such should be corrected as early as is feasible. Studies of the habit indicate that it is specifically related to malocclusions in about 16 per cent of the patients and is related indirectly as a factor complicating a sizeable number of other malocclusions.

The family dentist, by approaching the problem from the dental standpoint, is eminently more able than other persons to achieve practical results in the correction of thumbsucking. From the firm foundation of his own field he is also better able to appreciate, assist and accept aid from the efforts of his health teammates, the pediatrician, the speech therapist and others.

The palatal crib is suggested as a practical appliance for reminding the child who sucks his thumb to keep his fingers out of his mouth and as a help for the child in losing the habit without losing his self-respect.

William F. Ford

CONSIDERATIONS IN THE ADMINISTRATION OF A GENERAL ANESTHETIC

T. J. Nidiffer. J. Missouri D.A. 35:14 Oct. 1955.

Ambulatory patients who are scheduled for a general anesthetic should be seen by the anesthetist the previous day and evaluated as an anesthetic risk. A printed questionnaire should be included in each patient's file with the following questions answered:

(1) Have you had a general anesthetic before; how did you react? (2) Do you have frequent headaches, sudden spells of dizziness or shortness of breath? (3) Do you become nauseated easily? (4) Do you have a sinus or asthmatic condition? (5) Are your tonsils present; are they hypertrophic or obstructing the airway? (6) Do you ever have pain in your chest while taking a deep breath? (7) Are you subject to nervous disorders? (8) Do you ever have swellings of the legs, ankles or feet? (9) Do you have heart trouble, rheumatic fever, lung disease, tuberculosis, liver disease, kidney disease, diabetes or arthritis? (10) Do you use tobacco and to what extent? (11) Do you use alcoholic beverages and to what extent? (12) Have you taken cortisone or ACTH in the last three months? (13) Do you have a sensitivity or allergy to any drugs or medicines? (14) Are you now taking any drugs or medicines? (15) Do you have a past history of anemia? (16) Do you have a past history of profuse bleeding? (17) When was your last physical examination and visit to a physician? (18) Is there anything else peculiar to your condition that the doctor should know?

The physical examination should evaluate the patient for breath-holding, heart sounds, pulse, blood pressure, hemoglobin determination and sedimentation rate. On the reverse side of the questionnaire, the patient should sign the authorization for administration of such anesthetic agents as the anesthetist deems necessary and for the performance of such operations and other surgical procedures under general anesthesia as the surgeon or operator considers necessary or desirable. The authorization should be dated, signed and witnessed by adults only.

General anesthesia can be successfully administered to almost every type of poor anesthetic risk without serious complications by instituting the proper preanesthetic measures, by selecting the anesthetic of choice for the particular patient and by being proficient in its use.

James Springer

THE STEROID HORMONES AND TISSUES OF THE PERIODONTIUM: A SERIES OF RELATED EXPERIMENTS IN WHITE MICE

Irving Glickman and Gerald Shklar. Oral Surg., Oral Med. & Oral Path. 8:1,179 Nov. 1955.

Steroid hormones were administered systemically to mice to determine the effect on periodontal tissues. The periodontal conditions were initiated by intermuscular injection of 0.25 mg. of cortisone every 24 hours for 35 days. All experiments were carefully controlled.

The microscopic examination of the mice injected with cortisone revealed osteoporosis of the alveolar bone, a condition which was characterized by a reduction in the number of osteoblasts and the amount of newly formed osteoid matrix; reduced height of the alveolar bone; reduced numbers of fibroblasts and col-

lagen fibers; fibrillar degeneration of the collagen fibers, and edema of the periodontal membrane.

These conditions were interpreted as resulting from the excess of cortisone and a resultant shift in the anabolic-catabolic balance necessary for the maintenance of the bone. This unbalance could be caused by a cortisone-induced accentuation of catabolism of the protein matrix of the bone, a cortisone-induced inhibition of normal anabolic processes or a combination of both phenomena.

A second group of mice received, in addition to the cortisone, 600 rat units of estradiol benzoate. The microscopic appearance of the alveolar bone differed considerably from that of the group injected only with cortisone. The interdental and interradicular septa revealed newly formed osteoid tissue and adjacent layers of osteoblasts. Both were distributed in a normal bone-formative pattern. The fibroblasts were well-formed and densely distributed among prominent collagen fibers.

A control group injected with only estradiol benzoate revealed a stimulation of endosteal bone formation. It was interpreted that estradiol benzoate leads to a reversal of the osteoporosis of the alveolar bone and that degeneration of the periodontium is induced by the systemic administration of cortisone.

William Lester McDaniel

ROTATING ABRASIVES IN THE MANAGEMENT OF PERIODONTAL SOFT AND HARD TISSUES

Lewis Fox. Oral Surg., Oral Med. & Oral Path. 8:1,134 Nov. 1955.

A preliminary report is made on the technic for use of rotating abrasives in the management of the soft and hard tissues in both gingivoplasty and osteoplasty.

Coarsely textured diamond points of various sizes and shapes are used in conjunction with a warm water spray to recontour the osseous tissue. A local anesthetic is essential. Other instruments used in the gingivectomy technic are utilized also since in gingivoplasty and osteoplasty many extensions of the surgical approach must be incorporated into the abrasive technic for successful results.

The technic described is suggested for use only on dense or fibrotic tissue. This method is not adaptable to soft or spongy tissue. Postoperative care consists of covering the wound with the usual combinations and variations of acceptable surgical packing technics.

Use of the rotating abrasive technic is suggested in the management of the periodontal soft and hard tissues in gingivoplasty and osteoplasty procedure because of the ease of application of the technic, its manipulative variability, the excellence of healing and the clinical end result.

William Lester McDaniel

DENTAL CARIES EXPERIENCE OF MONTANA STUDENTS

Lura M. Odland, Louis Page and Stanley T. Dohrman. J. Am. Dietet. A. 31:1,218 Dec. 1955.

In the fall of 1950 entering freshman students at Montana State College were examined. They had a mean of 13.4 DMF teeth with a mean DMF score of 15.2 for the 124 women and 12.0 for the 170 men. When the freshmen were classified according to the fluoride content of the home water supplies, a consistent decrease from 15.6 to 5.7 in mean DMF scores was observed as the fluoride content of the home water supply increased from 0.0 to 1.7 ppm.

DMF scores for 15 year old boys and girls in Bozeman and Great Falls, with 0.0 and 0.9 ppm fluoride respectively in the water supplies, were 12.2 in the former and 6.3 in the latter. In the classifications of DMF teeth and DMF surfaces, as well as for the individual components of decayed or filled teeth, the Bozeman scores were consistently double those for the Great Falls area. In the studies of both freshmen and 15 year old students, the DMF scores of the girls were slightly higher than those of the boys.

N. C. Hudson

OSSEOUS DYSPLASIA: A REACTION OF BONE TO INJURY

Hamilton B. G. Robinson. J. Oral Surg. 14:3 Jan. 1956.

Bone, the most plastic of the body tissues, may react to injury by resorbing or sclerosing. The osteoclastic and osteoblastic activity may be in varying proportions and may result in growth, atrophy or dysplasia. The maxilla and mandible are unique in that they contain numerous teeth whose roots are within the bone and whose crowns are outside the body tissues.

For this reason many reactions of the jaw bones to injury from infection and trauma related to the teeth can be anticipated. The reactions to injury may be termed osseous dysplasia to differentiate them from neoplastic lesions (fibro-osteoma) and metabolic disturbances (fibrous dysplasia). Among the

lesions that may be classified as types of osseous dysplasias are those varying from osteoclasia to sclerosis. So-called cementomas are probably local regions of osseous dysplasia.

BALLOON TECHNIC FOR TREATMENT OF FRACTURES OF THE ZYGOMATIC BONE

Venard R. Jackson, Joseph A. Abbey and Sanford Glanz. J. Oral Surg. 14:14 Jan. 1956.

The zygomatic bone is one of the bones most commonly fractured in automobile accidents and acts of violence. There have been many technics developed for the proper aligning of this bone. Many of these fractures are complicated and accompanied by comminuted fractures of the maxilla in the region of the maxillary sinus.

A new instrument, the nasal antral balloon, may be used in the treatment of such fractures. It is inserted in the maxillary sinus by enlarging the natural nasal-antral opening. The balloon is then inflated, and the pressure restores the normal contour of the maxillary sinus; in so doing, it aligns the zygomatic portion of the orbital floor and the comminuted walls of the maxillary sinus.

This new instrument possesses several advantages. The balloon serves as a fixation appliance until union has occurred. It reduces the possibility of sinus infection by restoring sinus form by eliminating blood clots and by promotion of proper drainage. There is no scarring of the face.

The simplicity of reduction and excellent results obtained with the balloon technic warrants its use in selected cases.

J. C. Tyler

ANTIBIOTIC TREATMENT OF THE GINGIVAL SULCUS IN THE PREVENTION OF POSTEXTRACTION BACTEREMIA

I. B. Bender and R. S. Pressman. J. Oral Surg. 14:20 Jan. 1956.

Previous attempts to prevent postextraction bacteremia have been through the preoperative administration of antibiotics by the parenteral route as a means of attacking the organisms after they have entered the blood stream. This study tests the hypothesis that bacteremias can be considerably reduced by attacking the organisms at the source, the gingival sulcus, before they enter the blood stream by the local use of antibiotic troches.

The 192 patients were divided into a control group of 93 and a medicated group of 99. Two different antibiotic troches were used, only one of which contained penicillin. The results were compared with those obtained from a group that received a standard dose of parenteral penicillin.

The results showed that the local application of antibiotics in the form of troches slowly dissolving in the mouth for one-half hour can be more effective than intramuscular penicillin in preventing postextraction bacteremia. Moreover, it was shown that when the trauma of extraction was severe, parenteral penicillin was ineffective while the troches were effective. In mild trauma both troches and parenteral penicillin were effective. The most effective of the three preparations was a troche containing penicillin, bacitracin, sulfadiazine and ethyl aminobenzoate. However, it is recommended that the troches should be used as an adjunct to, not as a substitute for, the parenteral administration of antibiotics in the prevention of postextraction bacteremia.

MANAGEMENT OF DIABETES MELLITUS DURING ORAL SURGICAL PROCEDURES

Alan S. Cohen. J. Oral Surg. 14:29 Jan. 1956.

On the basis of clinical experience, the following procedure for management of the diabetic patient during oral surgical procedures has been developed at the Boston City Hospital:

Preoperative: (1) Routine examinations, including urinalysis and blood sugar determinations are made. (2) The status of diabetes is evaluated, and dietary and insulin therapy are administered as indicated. (3) The day before surgery, an extra 50 to 100 Gm. of carbohydrate is given. (4) No change in the administration of insulin is made for minor procedures lasting less than one hour. (5) In major operations lasting more than one hour, with or without general anesthesia, half the daily dose of long-acting insulin and a slow intravenous infusion of 5 per cent dextrose in water are given. (6) Cultures are made and antibiotics administered for infections.

Surgical: (1) Anesthesia is determined solely by surgical indications. (2) Diabetic patients are scheduled for procedures early in the day whenever possible. (3) Surgical procedure technics are the same as those used for nondiabetic patients.

Postoperative: (1) If a major procedure is performed, slow intravenous administration of dextrose is continued. (2) The remainder of the daily dose of long-acting insulin is given with supplementary doses of regular insulin

where indicated. (3) Oral feedings are given as soon as feasible; adequate caloric intake is important. (4) Frequent urinalysis (every four hours) and blood test for sugar (at least daily) are made. (5) The total usual dose of insulin is resumed the morning after the operation. (6) The regular diet also is resumed the morning after the operation.

The person with diabetes that is well controlled medically will present few problems to the oral surgeon, but it is the responsibility of both internist and surgeon to observe their patient closely so that no complications arise.

Barbara G. Kenadjian

ROENTGEN RAY THERAPY OF THE TEMPOROMANDIBULAR JOINT

W. A. Goodrich, Jr., and W. A. Johnson. J. Oral Surg. 14:35 Jan. 1956.

Roentgen ray therapy of the temporomandibular syndrome for symptomatic relief has been advised, but no technical data nor results are reported in the literature. Forty-five patients with this syndrome were treated at Scott and White Clinic from 1946 to 1953. The result of their treatment was evaluated.

Treatment was by roentgen rays, using standard deep therapy equipment. The technic is described in detail. The usual dose was 200 r (in air), given in a single sitting.

Most patients had conditions diagnosed as temporomandibular joint arthrosis; a few with a presumptive but atypical diagnosis were treated also. Of the former, 75 per cent experienced good relief. Of the equivocal and atypical cases, less than a fourth showed adequate symptom improvement.

Roentgen ray therapy was utilized primarily to relieve symptoms. Other methods of therapy, including correction of abnormal bite and immobilization, also were used as needed.

It is concluded that: (1) roentgen ray therapy is definitely of benefit in the true temporomandibular syndrome; (2) results are of the same order as radiation therapy of bursitis and tendonitis in other joints, and (3) acute cases respond better than chronic ones.

A SIALOLITH WITHIN THE SUBMAXILLARY DUCT AND GLAND: REPORT OF CASE

Newton E. Allen. J. Oral Surg. 14:65 Jan. 1956.

A salivary calculus 3.5 by 1.6 cm. in size that had produced disagreeable symptoms over a period of 20 years was removed.

The patient, a 49 year old man, had been referred by his physician for the diagnosis and management of pain and swelling in the region of the left submaxillary gland. Similar attacks had occurred repeatedly over a period of 20 years. Clinical and roentgenographic examination revealed the presence of a large salivary calculus between the floor of the mouth and the extraoral swelling.

Under local anesthesia, by a combination of blunt and sharp dissection, a capsule containing the calculus was reached and incised, exposing a portion of the calculus. The tip was grasped, and by rotary motion the sialolith was elevated and delivered through the floor of the mouth. Apparently, the bulbous part of the calculus had rested within the submaxillary gland and the narrow, constricted part in Wharton's duct. A patent flow of saliva was ensured by suturing the edges of the capsule to the margins of the incision in the oral mucosa.

The postoperative course was uneventful. Two days after the operation, little swelling remained, and the patient stated that he was completely comfortable for the first time in 20 years. Five days later the wound apparently had healed, and all swelling had disappeared. The patient was dismissed on the fifteenth postoperative day. Four months after the operation, no further trouble had been experienced.

PACHYDERMA ORALIS

Roy C. Kinney and Randall S. Derifield. J. Oral Surg. 14:71 Jan. 1956.

During a routine dental examination of a 42 year old white man, an unusual condition of the entire intraoral mucosa was found. The condition of these tissues resembled leukoplakia, but the cause of the condition was not that of leukoplakia. A check of the literature revealed a few similar instances, in which this condition had been present since birth and, in some instances, had a familial history. The authors of previous articles describing this lesion termed it a nevus.

A biopsy of the lesion gave no indication that the lesion was precancerous.

Because of generalized periodontal disease and the presence of several alveolar abscesses, the teeth were extracted and complete dentures inserted.

In a follow-up examination one year later, the oral condition was unchanged except for a return to normal appearance of the tissue in the denture-bearing regions. It is believed that this is a case of pachyderma oralis, an atypical leukoplakia.

Deaths

Armstrong, William B., Morristown, Ariz.; Ohio College of Dental Surgery, University of Cincinnati, 1902; died November 22; aged 79.

Bernstein, Abraham L., New York; School of Dentistry, University of Buffalo, 1919; died October 6; aged 63.

Bubien, Eugene S., Los Angeles; College of Dentistry, University of Southern California, 1955; died July 31; aged 25.

Costoff, Socrates, New York; died March 27, 1955; aged 58.

Cullen, Nathan B., Brooklyn; School of Dentistry, University of Pennsylvania, 1928; died October 30.

Dyer, Walter L., Englewood, N. J.; College of Dental and Oral Surgery, New York, 1913; died April 2, 1955.

Eaton, Carroll R., Adams, Wis.; Dental School, Northwestern University, 1898; died in November, 1954.

Ferguson, Marion G., Arkadelphia, Ark.; New Orleans College of Dentistry, 1907; died July 8; aged 78.

Finney, Harry D., McKeesport, Pa.; Ohio College of Dental Surgery, University of Cincinnati, 1895; died May 13, 1955; aged 83.

Fowler, John H., Kearney, Neb.; Dental School, Northwestern University, 1898; died March 31, 1955; aged 84.

Fox, Nathan, New York; died March 20, 1955; aged 63.

Goldin, Morris J., New York; New York College of Dentistry, 1911; died November 8.

Griswold, Virgil H., Rochester, N. Y.; died January 17, 1955; aged 76.

Hall, Kenneth A., Hornell, N. Y.; School of Dentistry, University of Buffalo, 1925; died September 5; aged 56.

Hall, Walter F., Cleveland; College of Dentistry, Ohio Medical University, 1903; died March 21, 1955; aged 77.

Harris, Sidney R., New York; died March 25, 1955; aged 55.

Hill, Carle E., Mangum, Okla.; Western Dental College, Kansas City, 1919; died January 1, 1955; aged 58.

Hogan, John M., Buffalo; died October 12.

Ingersoll, Francis B., Pasadena, Calif.; Dental School, Northwestern University, 1903; died January 22, 1954.

Jones, James D., Prattville, Ala.; Southern Dental College, Atlanta, 1901; died April 28, 1955; aged 80.

Kaep, Henry J., Dubuque, Iowa; Dental School, Northwestern University, 1922; died November 17; aged 56.

Lidington, William H., Newport, Ky.; Ohio College of Dental Surgery, University of Cincinnati, 1922; died June 3, 1955.

Magruder, Benjamin L., Starkville, Miss.; Southern Dental College, Atlanta, 1892; died June 6; aged 84.

McCauslen, George W., Pittsburgh; died May 17, 1955; aged 93.

McIntyre, Ralph E., Madison, Wis.; College of Dentistry, University of Michigan, 1905; died March 14, 1955; aged 77.

Miller, Paul E., New Haven, Ind.; Chicago College of Dental Surgery, Loyola University, 1911; died January 15, 1955; aged 71.

Mobley, William D., Richton, Miss.; died August 24; aged 75.

Montelius, John W., Chicago; died July 17; aged 63.

Morton, Perry J., Lincoln, Neb.; Dental School, Northwestern University, 1903; died April 15, 1955; aged 74.

O'Dell, Lloyd, Chicago; died November 5; aged 57.

Portlock, Eric F., Selma, Ala.; Dental Department, Meharry Medical College, 1916; died April 19, 1955; aged 60.

Rugtiv, Arthur N., Estherville, Iowa; College of Dentistry, University of Iowa, 1950; died February 11, 1955; aged 29.

Schwomeyer, Karl T., Indianapolis; Indiana Dental College, 1923; died June 2; aged 53.

Shepherd, Harris B., Cazenovia, N. Y.; died November 1; aged 79.

Shepley, Helen Rulison, Reno, Nev.; College of Dentistry, University of California, 1897; died June 6; aged 84.

Siegal, Louis R., Hartford, Conn.; Louisville College of Dentistry of Centre College, 1915; died August 5; aged 63.

Stebbins, Leon A., Grand Rapids, Mich.; College of Dental Surgery, University of Michigan, 1904; died November 12; aged 76.

Stone, J. Donald, Philadelphia; School of Dentistry, University of Pennsylvania, 1915; died February 19, 1955; aged 61.

Stover, Harry C., Harrisburg, Pa.; Baltimore College of Dental Surgery, University of Maryland, 1899; died August 14; aged 78.

Stowell, Tilton C., Mishawaka, Ind.; Indiana Dental College, 1902; died June 24; aged 81.

Strauss, Andries M., Corpus Christi, Texas; College of Dental Surgery, University of Michigan, 1921; died August 10; aged 57.

Stucky, Herman D., Elmhurst, Ill.; Chicago College of Dental Surgery, Loyola University, 1929; died September 3; aged 59.

Study, Carl A., Winchester, Ind.; Indiana Dental College, 1904; died September 19; aged 77.

Summers, James M., Nashville, Tenn.; College of Dentistry, University of Tennessee, 1950; died May 2, 1955; aged 32.

Sutcliffe, George C., St. Louis; School of Dentistry, St. Louis University, 1922; died August 19; aged 55.

Swank, Roland M., New Kensington, Pa.; School of Dentistry, University of Pittsburgh, 1918; died October 18; aged 66.

Swartz, Howard E., East Pittsburgh, Pa.; School of Dentistry, University of Pittsburgh, 1916; died October 21; aged 55.

Taylor, A. R., Arlington, Texas; died October 14; aged 78.

Taylor, Arthur R., Newark, N. J.; School of Dentistry, St. Louis University, 1944; died November 16; aged 42.

Taylor, James H., Sandusky, Ohio; College of Dentistry, Howard University, 1922; died June 23; aged 64.

Taylor, Lemuel E., Medinah, Tenn.; Dental School, Northwestern University, 1901; died August 19; aged 76.

Taylor, William O., Dothan, Ala.; Atlanta-Southern Dental College, 1928; died July 5; aged 49.

Theurer, Louis F., Seattle; died September 4; aged 75.

Thomas, Constantin J., Chicago; Dental School, Northwestern University, 1918; died November 2; aged 68.

Thomas, George M., Rochester, N. Y.; died February 9, 1955; aged 54.

Thompson, Emory C., Buffalo; Baltimore College of Dental Surgery, 1902; died May 8, 1955; aged 76.

Thompson, Henry G., Columbia, S. C.; died October 29.

Thomson, Harry L., Daytona Beach, Fla.; Baltimore College of Dental Surgery, University of Maryland, 1907; died October 21; aged 71.

Tilden, Morton C., Chicago; Dental School, Northwestern University, 1904; died August 11; aged 81.

Torrence, Charl J., St. Louis; School of Dentistry, St. Louis University, 1917; died October 6; aged 62.

Trinkle, Leonard E., Terre Haute, Ind.; Indiana Dental College, 1904; died August 3; aged 77.

Trout, Bert E., Des Moines, Iowa; Louisville College of Dentistry of Centre College, 1898; died August 30; aged 82.

Trowbridge, Z. Harry, St. Albans, W. Va.; Ohio College of Dental Surgery, 1912; died August 25; aged 66.

Truesdell, Blaine, Alexandria, Va.; Kansas City Dental College, 1926; died July 18; aged 73.

Van Alstine, Chauncey D., Albany, N. Y.; School of Dentistry, University of Buffalo, 1908; died November 16; aged 71.

Vander Wolff, Josephine E., Chicago; Dental School, Northwestern University, 1916; died September 3; aged 69.

Van Loon, John A., Detroit; Department of Dental Surgery, Detroit College of Medicine, 1907; died July 28; aged 82.

Van Valin, Ralph W., Newberg, Ore.; School of Dentistry, North Pacific College of Oregon, Portland, 1916; died November 1; aged 72.

Van Zant, Frank N., Rantoul, Ill.; Chicago College of Dental Surgery, Loyola University, 1928; died October 12; aged 50.

Vessells, Francis M., Jr., Perryville, Mo.; School of Dentistry, St. Louis University, 1919; died October 23; aged 59.

Vichick, Anthony F., Cleveland; Chicago College of Dental Surgery, Loyola University, 1933; died September 12; aged 50.

Voiers, Allen L., Jeffersonville, Ind.; Western Dental College, Kansas City, 1900; died December 30, 1954.

Wagner, Frederick R., Mahanoy City, Pa.; School of Dentistry, University of Pennsylvania, 1900; died October 10; aged 79.

Waidt, Louis P., Portland, Ore.; School of Dentistry, North Pacific College of Oregon, Portland, 1914; died September 29; aged 62.

Wallace, Dorrace G., Hayward, Calif.; College of Dentistry, University of California, 1917; died November 5; aged 62.

Walling, A. Mark, Spencer, Iowa; College of Dentistry, University of Iowa, 1930; died August 7; aged 50.

Walsh, Joseph R., Short Hills, N. J.; School of Dentistry, University of Pennsylvania, 1922; died in November; aged 58.

Walton, Thomas H., Kansas City, Mo.; Marion-Sims Dental College, St. Louis, 1903; died August 9; aged 75.

Waring, Andrew B., Kansas City, Mo.; died August 13; aged 76.

Warren, Ralph D., Bath, Maine; Dental School, Tufts College, 1919; died October 28; aged 57.

Watkins, Henry E., Oak Bluffs, Mass.; Dental School, Harvard University, 1902; died November 1; aged 77.

Watts, Charles B., Magee, Miss.; School of Dentistry, University of Buffalo, 1903; died August 28; aged 74.

Wehrheim, Lawrence A., Chicago; Dental School, Northwestern University, 1918; died September 22; aged 62.

Weinstein, Edwin T., Philadelphia; Philadelphia Dental College, 1918; died September 15; aged 57.

Weiss, Edwin B., Minneapolis; Wisconsin College of Dentistry, Department of Carroll College, 1909; died August 20; aged 70.

Westhofen, Hugo, Milwaukee; College of Dentistry, State University of Iowa, 1896; died June 7; aged 81.

Weybright, William H., Huntington, Ind.; College of Dental Surgery, University of Michigan, 1902; died May 30, 1955; aged 78.

Wheeler, Leonard O., Clinton, Ind.; College of Dentistry, Ohio State University, 1918; died June 2; aged 61.

Whiteaker, Richard O., Fredericktown, Mo.; School of Dentistry, Washington University, St. Louis, 1937; died August 31; aged 41.

Whitson, Abram P., Duluth, Minn.; College of Dentistry, University of Minnesota, 1908; died August 25; aged 75.

Wiley, Alfred T., Tiffin, Ohio; College of Dentistry, Ohio Medical University, 1902; died November 6; aged 76.

Wilkins, Walter M., Detroit; College of Dental Surgery, University of Michigan, 1894; died August 21; aged 82.

Wilkinson, Frank G., Atlantic City, N. J.; Pennsylvania College of Dental Surgery, Philadelphia, 1908; died July 24; aged 70.

Will, Melville B., Bertha, Minn.; College of Dentistry, University of Minnesota, 1908; died October 29; aged 73.

Williams, George W., St. Louis; School of Dentistry, St. Louis University, 1918; died August 25; aged 64.

Williams, Maurice S., New York; School of Dentistry, University of Buffalo, 1907; died November 24; aged 70.

Williams, Ralph H., Pittsfield, Mass.; died October 6; aged 78.

Williams, Randall S., Tacoma, Wash.; Chicago College of Dental Surgery, Loyola University, 1901; died July 16; aged 76.

Wilner, Charles, New York; New York College of Dentistry, 1914; died August 20; aged 64.

Wilson, Frank N., Leavenworth, Kan.; Western Dental College, Kansas City, 1914; died November 22; aged 67.

Wilson, George W., Aurora, Ill.; Chicago College of Dental Surgery, Loyola University, 1897; died November 10; aged 84.

Wilson, Houston, Jr., Tuscaloosa, Ala.; Atlanta-Southern Dental College, 1943; died March 2, 1955; aged 33.

Witt, George C., Indianapolis; Indiana Dental College, 1901; died September 11; aged 83.

Wolford, William C., Seward, Pa.; Pittsburgh Dental College, Western University of Pennsylvania, 1901; died May 27, 1955; aged 81.

Wood, Isaac V., Mobile, Ala.; School of Dentistry, Loyola University, New Orleans, 1937; died June 25; aged 43.

Wooster, Ray H., Canton, Ohio; Chicago College of Dental Surgery, Loyola University, 1912; died November 7; aged 69.

Wright, George H., Brooklyn; died August 24.

Yantis, George A., Olympia, Wash.; School of Dentistry, North Pacific College of Oregon, Portland, 1925; died October 14; aged 54.

Yarrington, Herbert H., Rutland, Vt.; Dental School, Harvard University, 1901; died August 15; aged 75.

Zee, Leo C. (Zehnpfennig), Midland, Texas; College of Dentistry, Creighton University, 1929; died August 5; aged 48.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Seventh Annual Session	Oct. 1-4, 1956	Atlantic City, N. J.
Ninety-Eighth Annual Session	Nov. 4-7, 1957	Miami, Fla.
Ninety-Ninth Annual Session	Nov. 10-13, 1958	Dallas, Texas
One-Hundredth Annual Session	Sept. 21-24, 1959	New York

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 15-17	Biloxi, Miss.	F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska	Aug. 15-18	Fairbanks	J. L. Irby	1010 Noble St., Fairbanks
Arizona	Apr. 11-14	Tucson	R. W. Christensen	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 8-11	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 23-25	San Francisco	W. J. Healy	450 Sutter St., San Francisco
S. California	Apr. 30-May 2	Los Angeles	J. P. Bowers	903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 21-24	Colorado Springs	W. R. Humphrey	Republic Bldg., Denver
Connecticut	May 2-4	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware	Jan. 1957		J. C. Gantt	1102 Madison St., Wilmington
District of Columbia			J. F. Keaveny	1029 Vermont Ave., N.W., Washington
Florida	May 28-30	Miami Beach	W. A. Buhner	167 Broadway, Daytona Beach
Georgia	Oct. 21-24	Savannah	J. W. Yarbrough	Bibb Bldg., Macon
Hawaii	Sept. 10-15	Maui Island	J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	Sept. 27-29	Sun Valley	D. E. Sonius	125 Fourth Ave., N., Twin Falls
Illinois	May 14-16	Springfield	P. W. Clopper	Jefferson Bldg., Peoria
Indiana	May 21-23	Indianapolis	D. C. Barnhill	Bankers Trust Bldg., Indianapolis
Iowa	May 6-9	Des Moines	H. I. Wilson	Insurance Exchange Bldg., Des Moines
Kansas	May 14-17	Topeka	F. A. Richmond	Brotherhood Bldg., Kansas City
Kentucky	Apr. 8-11	Louisville	A. B. Coxwell, Jr.	1976 Douglass Blvd., Louisville
Louisiana	Apr. 11-14	Alexandria	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 21-23	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland	May 7-9	Baltimore	C. L. Inman, Jr.	Medical Arts Bldg., Baltimore
Massachusetts	May 6-9	Boston	H. E. Tingley	12 Bay State Rd., Boston
Michigan	Apr. 16-19	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Apr. 23-25	St. Paul	C. V. E. Cassel	Hamm Bldg., St. Paul
Mississippi	June 10-13	Biloxi	B. A. Cohen	Plaza Bldg., Jackson
Missouri	May 6-9	Jefferson City	E. D. Suggett	Merchants Bank Bldg., Jefferson City
Montana	May 3-6	Helena	E. G. Vedova	Box 311, Roundup
Nebraska	Apr. 30-May 3	Omaha	F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada	May 7-9	Las Vegas	O. M. Seifert	506 Humboldt St., Reno
New Hampshire	June 24-27	Rye Beach	F. E. Williams	814 Elm St., Manchester
New Jersey	Apr. 23-25	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 20-24	Santa Fe	J. S. Eilar	Medical Arts Sq., N.E., Albuquerque
New York	May 14-16	Syracuse	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 13-16	Pinehurst	R. D. Coffey	Box 270, Morganton
North Dakota	May 6-9	Minot	J. H. Pfister	419½ Dakota Ave., Wahpeton
Ohio	Oct. 28-31	Columbus	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 22-25	Oklahoma City	S. A. Russman	Medical Arts Bldg., Oklahoma City
Oregon			T. D. Holder	Selling Bldg., Portland
Panama Canal Zone	Apr. 21		J. J. Dunne	5700 Dispensary, Albrook Air Force Base
Pennsylvania	Apr. 19-21	Harrisburg	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico	Nov. 25		R. Carrasquillo	P.O. Box 214, Rio Piedras

State	Date	Place	Secretary	Address
Rhode Island			J. S. Allen	Union Trust Bldg., Providence
South Carolina	May 6-8	Spartanburg	J. R. Owings	7 Medical Court, Greenville
South Dakota	May 13-16	Huron	R. E. Decker	Parker
Tennessee	Apr. 30-May 3	Memphis	A. M. Ballentine	Pulaski
Texas	Apr. 29-May 2	Fort Worth	W. Ogle	3707 Gaston Ave., Dallas
Utah	May 17-19	Salt Lake City	R. C. Dalgleish	State Capital Bldg., Salt Lake City
Vermont	May 20-22	Manchester	E. H. Van Santvoord	128 Merchants Row, Rutland
Virginia	May 9-12	Roanoke	W. T. McAfee	Colonial National Bank Bldg., Roanoke
Washington			W. B. Martin	Medical-Dental Bldg., Seattle
West Virginia	July 22-25	White Sulphur Springs	G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 9-11	Milwaukee	A. E. Kopp	Wells Bldg., Milwaukee
Wyoming	June 14-16	Cody	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 24-29* June 25, 26†	Birmingham	W. L. McCarty	Professional Center, Montgomery
Alaska	Aug. 7-10* Aug. 7, 8†	Fairbanks	R. H. Williams	Box 2122, Juneau
Arizona	June 18-22* June 20†	Florence	W. G. Biddulph	1502 W. Osborn Rd., Phoenix
Arkansas	June 18-22	Little Rock	W. T. Jones	107 E. Shelton, Monticello
California	June 18 July 23	Los Angeles San Francisco	T. E. Tilden	Medico-Dental Bldg., Sacramento
Colorado	June 25-29	Denver	J. M. Peabody	Republic Bldg., Denver
Connecticut	June 17-23* June 17-23†	New York Bridgeport	C. G. Brooks	302 State St., New London
Delaware	June 25*† June 26-28*†	Philadelphia Wilmington	P. K. Musselman	143 W. Main St., Newark
District of Columbia	June 4-7, 9	Washington	W. T. Birthright	1835 Eye St., N.W., Washington
Florida	July 9-19*†	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Georgia			P. M. McNeil	First National Bank Bldg., Rome
Hawaii	Aug. 30-Sept. 3‡		H. L. Houvener	Dillingham Bldg., Honolulu
Idaho	June 25	Boise	A. G. DeWinter	Sun Bldg., Boise
Illinois	June 26-29‡ Nov. 27-30‡		W. A. McKee	Wood Bldg., Benton
Indiana	June 12-15*†	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Iowa	May 28-June 1*†	Iowa City	P. A. Hahn	Farmers & Merchants Bank Bldg., Burlington
Kansas	June 11-14‡		G. L. Teall	Box 71, Hiawatha
Kentucky	June 4-7*†	Louisville	J. J. Kelly	102 W. Madison St., Franklin
Louisiana	June 3-8	New Orleans	R. C. Steib	Maison Blanche Bldg., New Orleans
Maine	June 18-20	Boston, Mass.	Alva S. Appleby	Box 260, Skowhegan
Maryland	June 11-13‡		H. Levin	3429 Park Heights Ave., Baltimore
Massachusetts	June 11,12* June 14, 15*†	Boston	T. J. Glennon	323 Main St., Woburn
Michigan	June 10-16	Ann Arbor	J. L. Champagne	3714 W. McNichols Rd., Detroit
Minnesota	June 11-15‡		M. G. Walls	615 Montcalm Place, St. Paul
Mississippi	June 19-21‡		J. C. Boswell	Lamar Life Bldg., Jackson
Missouri			R. R. Rhoades	Central Trust Bldg., Jefferson City
Montana			R. O. Betzner	303 Power Block, Helena
Nebraska	June 8-14	Lincoln	H. E. Weber	Federal Securities Bldg., Lincoln
Nevada	June 25	Reno	R. Whitehead	Masonic Temple, Reno
New Hampshire	June 21, 22* June 21†	Boston	S. G. Markos	8 Renaud Ave., Dover
New Jersey	June 25-28 June 29, 30	Philadelphia Trenton	W. A. Wilson	150 E. State St., Trenton
New Mexico	June 18-23	Santa Fe	J. J. Clarke, Sr.	Artesia
New York	June 21, 22, 26-29*‡ June 21, 22, 26, 27†‡ Oct. 10, 11, 16-19*‡ Oct. 10, 16, 17†‡		D. W. Beier	23 S. Pearl St., Albany 7

State	Date	Place	Secretary	Address
North Carolina	June 25‡	Chapel Hill	J. H. Guion	Doctors Bldg., Charlotte 7
North Dakota	July 9-13	Fargo	T. M. Flath	Williston
Ohio	June 14-16, 18-20	Columbus	H. B. Smith	322 E. State St., Columbus
Oklahoma	June 18-20*†	Oklahoma City	W. E. Cole	First National Bldg., Oklahoma City
Oregon	June 4-7*†	Portland	F. L. Utter	Pioneer Trust Bldg., Salem
Pennsylvania	June 18-23*†	Philadelphia Pittsburgh	A. M. Stinson	Dept. of Public Instruction, Box 911, Harrisburg
Puerto Rico			J. Mercado C.	Box 3717, Santurce
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina	June 21-23	Columbia	J. L. Gunter	1226 Pickens St., Columbia
South Dakota	June 17-20	Sioux Falls	H. T. Aker	Canton
Tennessee	June 11-15‡		C. R. Alta	Bennie Dillon Bldg., Nashville
Texas	June 10-16* June 14-16†	Houston	R. T. Weber	Capital National Bank Bldg., Austin
Utah			G. W. Vogel	Eccles Bldg., Ogden
Vermont	June 25-27*†	Burlington	P. M. Fitch	Newport
Virginia			J. M. Hughes	Medical Arts Bldg., Richmond
Washington	June 18-21	Seattle	M. L. Mower	National Bank of Commerce Bldg., Olympia
West Virginia	June 25-27*†	West Liberty	J. B. Davis	Goff Bldg., Clarksburg
Wisconsin	June 4-8*†	Milwaukee	S. F. Donovan	Tomah
Wyoming			W. A. Hocker	O & S Bldg., Casper

Most states require applications to be in 30 days prior to examination date.
*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations. ‡Approximate dates—verify with state dental examining board.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Denture Prosthetics	Apr. 29-May 6	Colorado Springs	I. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
American Academy of Dental Medicine	June 21-24	Detroit	G. J. Witkin Secy.	45 S. Broadway, Yonkers, N.Y.
American Academy of Pedodontics	June 11-15	Milwaukee	E. C. Schildwachter Secy.	6831 Seville Ave., Huntington Park, Calif.
American Association of Dental Examiners	Sept. 28, 29	Atlantic City, N.J.	C. A. Bumstead Secy.	Stuart Bldg., Lincoln, Neb.
American Association of Industrial Dentists	Apr. 24-26	Philadelphia	E. R. Aston Secy.	South Office Bldg., Harrisburg, Pa.
American Association of Orthodontists	Apr. 29-May 3	Boston	F. A. Squires Secy.	Medical Centre, White Plains, N.Y.
American Board of Dental Public Health	Sept. 27, 28	Atlantic City, N.J.	P. E. Blackerby, Jr. Secy.	250 Champion St., Battle Creek, Mich.
American Board of Oral Surgery	Apr. 7-10	Chicago	L. M. FitzGerald Secy.	Roshek Bldg., Dubuque, Iowa
American Dental Society of Europe	July 10-13	London, England	J. P. Molony Hon. Secy.	110 Harley St., London W.1, England
American Society of Dentistry for Children	Sept. 28-30	Atlantic City, N.J.	H. C. Hester Pub. Chm.	Arcade Bldg., Glen Ridge, N.J.
American Society of Oral Surgeons	Sept. 25-28	New York	R. F. Whalen Exec. Secy.	M.C.V. Box 876, Richmond, Va.
British Dental Association	June 25-29	Brighton, Sussex, England	H. P. Buchanan Secy.	13 Hill St., Berkeley Sq., London, England
Canadian Dental Association	June 3-6	Banff, Canada	R. L. Rasmussen	Greyhound Bldg., Calgary, Alberta, Canada
Chicago Dental Society	Feb. 3-6, 1957	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Council on Dental Education, Dental Aptitude Tests	Apr. 27, 28		S. Peterson Secy.	222 E. Superior St., Chicago
Federation Dentaire Internationale	May 28-June 3	Zurich, Switzerland	G. H. Leatherman Secy. Gen.	35 Devonshire Place, London, England
Federacion Odontologica Argentina	May 27-30		M. P. Lesdema	Catamarca 2467, Santa Fe, Argentina

Name	Date	Place	Secy. or Chm.	Address
French Society of Dento-facial Orthopedics—II Meeting of Spanish Society of Orthodontics	May 16-20	Madrid, Spain	P. Planas	Claudio Coelli 67, Madrid, Spain
Maritime Dental Association Convention	June 27-29	Halifax, Nova Scotia, Canada	E. F. Dexter Secy.	5 Dutch Village Rd., Halifax, Nova Scotia, Canada
Medical Library Association	June 18-22	Los Angeles	A. N. Brandon Chm.	College of Medical Evangelists, P. O. Box 278, Loma Linda, Calif.
National Board of Dental Examiners	Apr. 2, 3		G. J. Casey Secy.	222 E. Superior St., Chicago
Northeastern Dental Society	June 3-6	Swampscott, Mass.	M. J. Frasca Secy.	153 Cabot St., Beverly, Mass.
Northwest Conference in Dental Medicine, Twelfth Annual Conference	May 13-17	Victoria, B.C., Canada	G. Underwood Secy.	Selling Bldg., Portland, Ore.
Quebec Dental Association	May 31-June 2	Quebec City, Canada	P. Jean Secy.	1294 Maguire Sillery, Quebec 6, P.Q., Canada
Seventh Annual Berkshire Conference	June 17-21	Lenox, Mass.	I. Glickman Dir.	Tufts University, School of Dental Medicine, 136 Harrison Ave., Boston
Southern Academy of Periodontology	Apr. 29-May 1	St. Petersburg, Fla.	W. Mayo Secy.	Brent Annex, Pensacola, Fla.
Southern Society of Orthodontists	Aug. 19-22	White Sulphur Springs, W.Va.	M. D. Edwards Secy.	132 Adams Ave., Montgomery, Ala.
Thirteenth German Dental Meeting	Aug. 20-26	Munich, Germany	F. H. Witt	Universitaetsstrasse 73, Cologne-Lindenthal, Germany
Thirty-first Italian Congress of Stomatology	Sept. 24-29	Florence, Italy	M. Bergamini	Via S. Gallo 25, Florence, Italy

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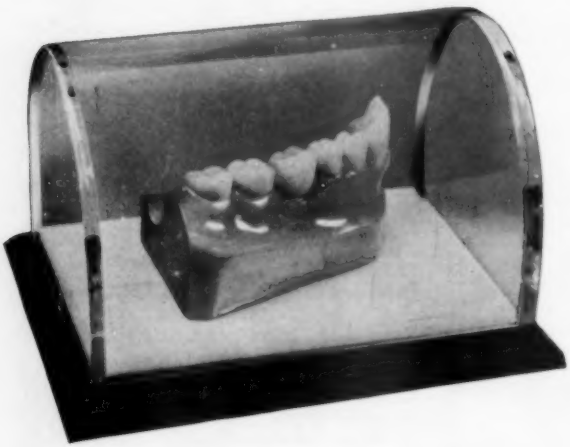

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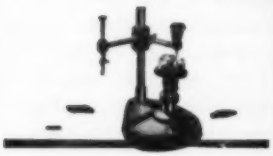

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1. Joint Report of the Council on Dental Health and the Council on Dental Therapeutics of the American Dental Association: Sugar and Dental Caries: The Effect on the Teeth of Sweetened Beverages and Other Sugar-Containing Substances, J. Am. Dent. A. 47:387 (Oct.) 1953.

2. Widdowson, E. M., and McCance, R. A.: Studies on the Nutritive Value of Bread and on the Effect of Variations in the Extraction Rate of Flour on the Growth of Undernourished Children, Medical Research Council, Special Report Series, No. 287, London, Her Majesty's Stationery Office, 1954.

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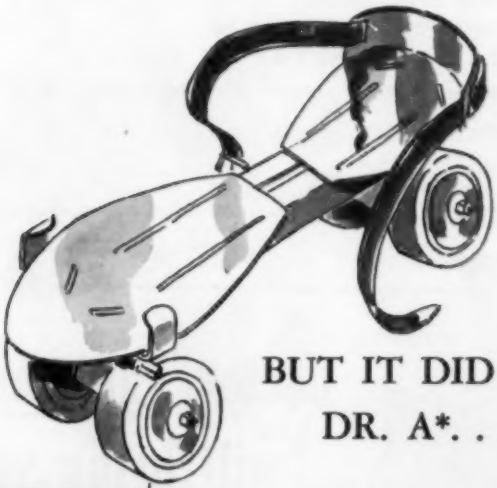

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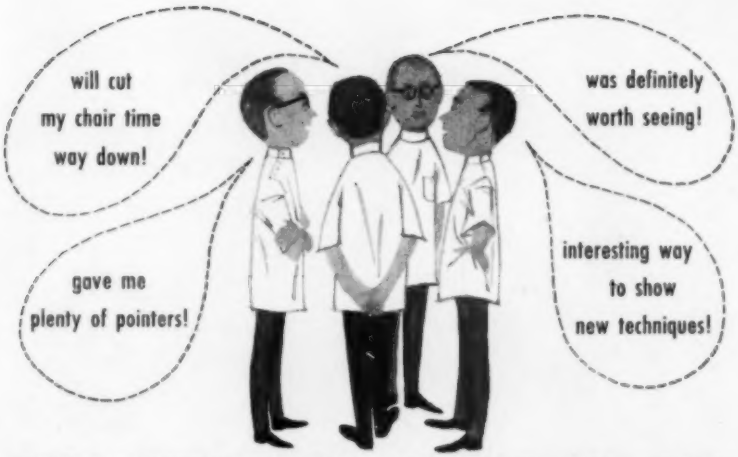

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DENTAL X-RAY NEWS

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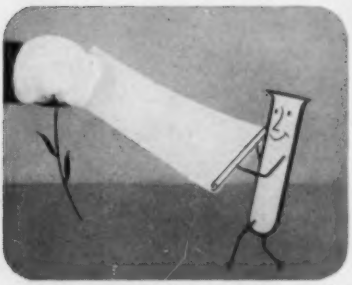
No. 2



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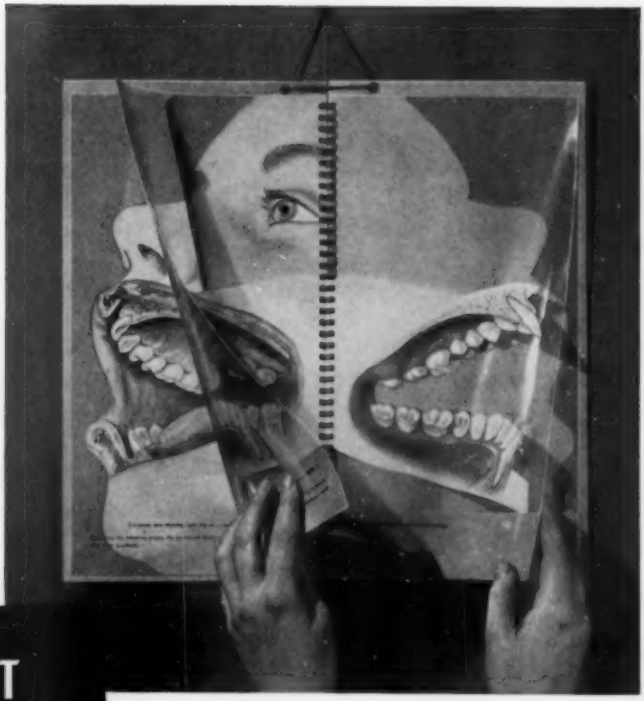

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Oct. 1-4, 1956
Atlantic City, N. J.

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Be sure to indicate your arrival time in Atlantic City. Reservations will be held only until 6 p.m. of the day you indicate when you will arrive in Atlantic City unless special arrangements are made with the hotel.

Names of all persons who intend to occupy the accommodations must be listed on the application.

List four choices of hotels. Confirmation will be sent to the applicant indicating which hotel has accepted the reservation.

Write the A.D.A. Housing Bureau in Atlantic City if you wish to cancel the reservation.

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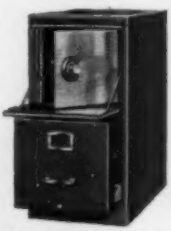

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NEW JERSEY—Atlantic City. Well established active practice and equipment. Center city. Living quarters if desired. Retiring because of illness. Excellent opportunity. Reasonable. Address A.D.A. Box No. 282.

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NEW JERSEY—For rent in growing district of Linden, one-chair dental office. Available at once. Reasonable. Address A.D.A. Box No. 283.

•

NEW YORK—For rent. Dental office suite. Two operating rooms, laboratory, business office, consultation room, dark room, reception and recovery rooms. Air-conditioned. Complete plumbing and x-ray equipment. Established as dental office 17 years. Harold Nester, 435 Exchange St., Geneva, N. Y.

•

NEW YORK—For rent. Dental office space with available flat in building with general practitioner. Good location. Phone 3-7755 or write: H. J. Sliski, M.D., 1040 W. Genesee St., Syracuse, N. Y.

•

OHIO—For sale. Five-room dental office and equipment, excellent downtown location, modern office building, reasonable rent, janitor service. Office established 15 years. Fast growing industrial city of 40,000 with steel and paper mills. Large surrounding area to draw from. Price open. Direct replies to Room 11, 9 S. Broad St., Middletown, O.

OHIO—For sale. Very reasonable. Only dentist in prosperous, growing south central Ohio town serving 9,500 people. 1953 S. S. White equipment, one operating room, laboratory, dark room, central air conditioning, blacktop parking lot, 1953 building, space designed for second operating room, well established, long recall list, gross very easily of $26,000. Beautiful six-room home available nearby. Owner leaving because of illness in family. Address A.D.A. Box No. 284.

OKLAHOMA—An opportunity which comes seldom to one desiring a selective location, beautiful individual office, and most desirable practice—all for the cost of building and present value of equipment. Address A.D.A. Box No. 247.

OREGON—Wanted: someone to take over excellent practice for price of equipment only. Located near Eugene. Spacious, ultra-modern office with reception room, business office, three operating rooms, two fully equipped; laboratory; recovery room and dark room. Extremely busy practice. At present grossing $40,000 annually. Dentist leaving to specialize. Excellent opportunity for right person. This must be seen to be appreciated. You make offer. Address A.D.A. Box No. 280.

PENNSYLVANIA—For sale. Residence and office combined, excellent condition—small industrial town—drawing population 5,000. One other dentist. Excellent opportunity. Easy terms. Address Dr. Harvey M. Hagedorn, Westfield, Pa.

PENNSYLVANIA—For sale or rent. Fully equipped two-chair dental offices, long established practice. Owner deceased. Write Mrs. John J. Ross, 106 Market St., Summit Hill, Pa.

PENNSYLVANIA—Wanted, dentist to take over active practice in southeastern Pennsylvania community of 3,000. Only dentist entering service. Ground floor office space for rent, new Ritter equipment for sale or rent. Address A.D.A. Box No. 253.

PENNSYLVANIA—Active practice. Sale or lease two years with option to buy. Reasonable terms. Good income and location. S.W. Philadelphia. Two operatories fully equipped. Going into specialty. Dr. Ludwig, SA. 5-4056 or write 1502 S. 58 St., Philadelphia.

PENNSYLVANIA — Allentown. For rent. Operating room; plumbing and electric outlets ready for dental unit, etc. Share reception room with dentist at this location 34 years. Apply E. W. Schlechter, 3315 Lincoln Circle, Allentown, Pa.

PENNSYLVANIA — Eastern Pennsylvania, long established dental office in excellent location, 3 rooms, dark room, lavatory, furnished waiting room shared with M.D., wiring and plumbing in place. Address A.D.A. Box No. 288.

PENNSYLVANIA—For sale. Excellent dental practice and residence. Modern equipment. Ideal location in small town of Pennsylvania Dutch country. Only dentist within 13 mile radius. Only 45 miles from Philadelphia just off Pennsylvania Turnpike. Excellent hunting, fishing, swimming in immediate vicinity. Established nine years. Doctor going abroad indefinitely. Address A.D.A. Box No. 302.

SOUTH CAROLINA—For sale. Modern, fully equipped office, excellent location in fast growing progressive city of Greenville. Owner wishes to leave state. Address A.D.A. Box No. 252.

VERMONT—For sale. Established dental practice. Beautiful northeastern community, exceptional educational facilities, year-round recreational activities, lovely lakes, nearby skiing areas. Perfect TV reception and nearby airline service. Reason: retirement. Now showing substantial yearly income; valuable real estate with modern equipment, reasonable terms granted. Harold Stuart, 140 Boylston St., Boston, Mass.

WEST VIRGINIA—Practice for sale, exodontics and oral surgery. Modern office, four operating rooms, town population 85,000, drawing area twice that. Average gross past five years $90,000. Owner leaving town. Address A.D.A. Box No. 277.

WISCONSIN—For sale or rent. Fully equipped modern dental office in city of 6,000 located in southwestern Wisconsin. Dentist passed away who had an exceptionally large denture practice. Ground floor office, long term lease, with or without equipment. Fully air conditioned. Address replies to Mrs. Daniel P. Fagan, 111 W. Cass St., Prairie du Chien, Wis.

LOCATIONS AVAILABLE

CALIFORNIA—First floor office, with two operatories, for rent in ten year established medical-dental building in Marysville. Across street from hospital and clinic. For information write Bruce Goodman, 246 C Street, Yuba City, Calif.

CONNECTICUT—Modern office for rent. Currently occupied by dentist. Available furnished if desired, with or without dental equipment. Write or telephone Dr. James E. Rubin, 139 Main St., Stamford, Conn.

ILLINOIS—Melrose Park. For rent. Dental office space available. Call GLadstone 5-5869.

ILLINOIS—Modern house and office for sale in beautiful residential area next to shopping center, bus stop; shortage of dentists in area. M.D. leaving town. Call Homewood 4366.

MISSOURI—LaBelle. Community of 900 with large drawing area. Good educational and church facilities. An ideal location for semi-retirement program or wonderful opportunity for family man. Address A.D.A. Box No. 304.

MISSOURI—Dentist, general practice, in town of 400 population, in rich farming area of Lafayette and Saline County. Office space available. Equipment of deceased dentist may be purchased cheap. Potential drawing area of 15 miles square including two neighboring towns. Address A.D.A. Box No. 309.

NEW YORK—Dental opportunity. Former physician's residence, center of beautiful upstate village of 1,400, main highway. Dentist needed. Ideal office space, six rooms and bath on first floor, six-room upstairs apartment now rented. All modernized. Two-car garage. Reasonable price and terms. Robert E. Atkinson, Unadilla, N. Y.

NEW YORK—Outstanding opportunity for the right individual in a rapidly expanding prosperous community near Poughkeepsie, N. Y. Complete, two operating room dental suite in brand new air-conditioned small professional building along with two physicians with large established practice. Must be well qualified to warrant sponsorship. For rent or other arrangement. Address A.D.A. Box No. 294.

NORTH DAKOTA—Dentist required for Hope and vicinity. Office space available in new clinic building. Write Hope Clinic Board, Hope, N. D.

WEST VIRGINIA—For rent. Office space in association with two compatible physicians for independent dental practice. In-

dustrial city, population 100,000, excellent location. Contact Administrator, Bolarsky Memorial Hospital, 56th St. & Noyes Ave., S.E., Charleston, W. Va.

OPPORTUNITIES AVAILABLE

Dentists

ARIZONA—Wanted. Dentist for children's dentistry exclusively, soon. Last two men here built lucrative practices. Rare opportunity for fine practice. Dr. L. P. Bairo, oral surgeon, 711 Professional Bldg., Phoenix, Ariz.

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CALIFORNIA—Wanted, associate in active pedodontic practice, opportunity to earn and learn. No financial outlay. Immediate income. Opportunity, if desired, for teaching. Bay area location. Address A.D.A. Box No. 225.

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CALIFORNIA—Pedodontist desires associate. Earn $13,000 to $16,000 per year plus paid vacation. Hospitalization, health and accident and life insurance benefits. Bonus and incentive plan. Must have California license. Write Dr. Paul Schiff, 808 E. Manchester Blvd., Inglewood, Calif.

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CONNECTICUT — Dentist wanted, experienced preferred, for association or partnership in modern, three-chair, air conditioned office. Address A.D.A. Box No. 278.

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ILLINOIS—Opportunity for young dentist in medical-dental building. Reasonable rent. Thriving community. Write Commercial National Realty, Peoria. Phone 66191, Mr. Harold Shreve.

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ILLINOIS—Dentist wanted as public dental health administrator in Peoria. Give full details as to education and experience. Salary open. Reply to Dr. L. B. McEwen, Secretary, 1011 Main St., Peoria.

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ILLINOIS—Wanted. Recent graduate. Male or female associate for well established general practice. Located far south side of Chicago. Modern, well-equipped, four-chair office. Will move into dental bungalow next fall. An excellent opportunity for the right person. Must be free from military service and have Illinois license. State age. Give full details as to professional experience and remuneration expected. Address A.D.A. Box No. 209.

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ILLINOIS—I have two-chair office in Chicago, far south side for 40 years. Want a fine young man as an associate with opportunity to purchase practice in a short time. Address A.D.A. Box No. 275.

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IDAHO—Wanted immediately, dentist. Wonderful opportunity for ambitious man. Town population 1,000, surrounding area approximately 3,000. Closest dentist 16 miles. New radar station now under construction. Office space available with low rent. Good big game hunting, fishing, and an abundance of outdoor sports, close. Contact Cottonwood Chamber of Commerce, Cottonwood, Idaho.

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NEW JERSEY—Young dentist wanted as part-time associate, in Plainfield, N. J. Address A.D.A. Box No. 300.

●

NEW YORK—Wanted, dentist. Permanent position, full time, excellent salary. Address A.D.A. Box No. 286.

●

NEW YORK—Opportunity for dentist with medical group practice in upstate New York. Must have New York state license. This group, offering comprehensive medical care, has three dentists, one vacancy at present. Semi-rural area. 120 miles from New York City. Salary commensurate with training and experience. Excellent opportunity for dentist interested in integrated medical practice, preventive medicine and rural living. Address A.D.A. Box No. 303.

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OHIO—Wanted, associate, Ohio license; permanent for reliable operator. Maximum fees, cash business, private practice. Laboratory in connection with office. Everything furnished, no investment required. Give full information—age, experience, marital status, etc. Address A.D.A. Box No. 291.

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TEXAS—Residency-dental prosthodontics, splendid two-year A.D.A. approved program. All phases prosthetic dentistry; close cooperation with maxillofacial and plastic surgeons. Affiliated Texas Dental College, Texas Medical Center. Paul L. Snyder, D.D.S., VA Hospital, Houston 31.

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VIRGINIA—Associate needed for Arlington office in new medical-dental building. Immediate income. State training and experience. Address A.D.A. Box No. 265.

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WASHINGTON—Dentists for foreign missionary work. Excellent opportunities for qualified men in all parts of the world. For details apply to The Missionary Dentist, 5543 25th Ave., N.E., Seattle 5.

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WISCONSIN—Director of city-wide program, at a salary range of $7,229 increasing to $8,222. Five day week, pension, civil service appointment. Excellent general health program. Dr. E. R. Krumbiegel, Milwaukee Health Dept., City hall, Milwaukee 2.

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SINGAPORE—University of Malaya. Applications invited for appointment of Senior Lecturer or Lecturer in Dentistry with special reference to conservative dentistry. Two vacancies exist. Candidates must have dental qualifications and teaching experience. Monthly emoluments including allowances range from: Senior Lecturer—US $623.50 to 706.50, Lecturer—US $420.00 to 673.00. Income tax approximately 10 per cent. Free first-class passage for appointee, wife and children under age 12. Provident Fund Scheme, low rental housing and other benefits. Particulars available from Inter-University Council, No. 1 Gordon Square, London W.C.1, England, with whom applications (nine copies) and names of three referents must be lodged by April 30th, 1956.

OPPORTUNITIES WANTED

Oral surgeon, B.S., D.D.S., M.S.—licensed in New York, New Jersey and Pennsylvania, eight years experience, efficient knowledge of inhalation, intravenous anesthesia, will conduct practice or accept position with an accredited oral surgeon for the months of June, July and August. Address A.D.A. Box No. 305.

●

Oral surgeon, married, 1947 graduate, service completed, over four years hospital training including general anesthesia; national; Connecticut, New York, Massachusetts boards, desires association with oral surgeon or group. Address A.D.A. Box No. 298.

●

Florida licensed dentist desires to purchase active general, surgery or orthodontic practice, St. Petersburg area. Will consider association arrangement. Address A.D.A. Box No. 274.

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Position wanted. Pennsylvania licensed dentist, service requirements completed, desires association in oral surgery. Three years surgical training. Available August 1, 1956. Address A.D.A. Box No. 285.

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New York, New Jersey licensed dentist, completing military service in June. Ex-

perience in periodontics and general dentistry. Interested in association or purchase in suburban area. Address A.D.A. Box No. 287.

•

Northwestern University graduate, age 25, licensed in Colorado and Florida, completing military obligation in August, desires association with established general practitioner. Partnership with eventual purchase of practice desired. Address A.D.A. Box No. 306.

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1954 graduate, Pennsylvania licensed, desires position, association or location, in Philadelphia or suburban area. Completing military tour in June 1956. Experienced in all phases of general dentistry. Address A.D.A. Box No. 289.

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General practitioner would like foreign service as dentist for corporation, government, or private practice. American citizen. References exchanged. Age 45. Address A.D.A. Box No. 293.

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New York licensed dentist, presently prosthetics specialist in Air Force, completing service August 1956. Desires to purchase general dental practice or enter into professional center building group in Westchester County. Address A.D.A. Box No. 292.

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New York licensed, New York University graduate, 1954, seeks position or association outside New York metropolitan area. Completing Air Force tour August 1956. Additional experience: exodontics, endondontics, periodontics and operative dentistry. Complete resume on request. Address A.D.A. Box No. 299.

•

California licensed dentist, age 26, completing service tour June 1956. Desires location, practice or association in southern California; preferably Orange County or vicinity. Excellent experience, including minor oral surgery training. Address A.D.A. Box No. 295.

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Private collector will purchase books or library, old dental and orthodontic texts, journals, old catalogs, exchange duplicates with collectors. Address A.D.A. Box No. 307.

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Wanted. Used Hanau articulators. Send model, number and price. M. N. Gibboney, Box 628, West Jefferson, Ohio.

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Wanted to buy. Ritter Model F. Split Type Unit. J. J. Vondracek, D.D.S., 100 W. 144th Street, Chicago 27.

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Old or used dental books, journals, prints. Leo L. Bruder, 1 DeKalb Ave., Dept. 21, Brooklyn, N. Y. Dealer in out-of-print dental literature.

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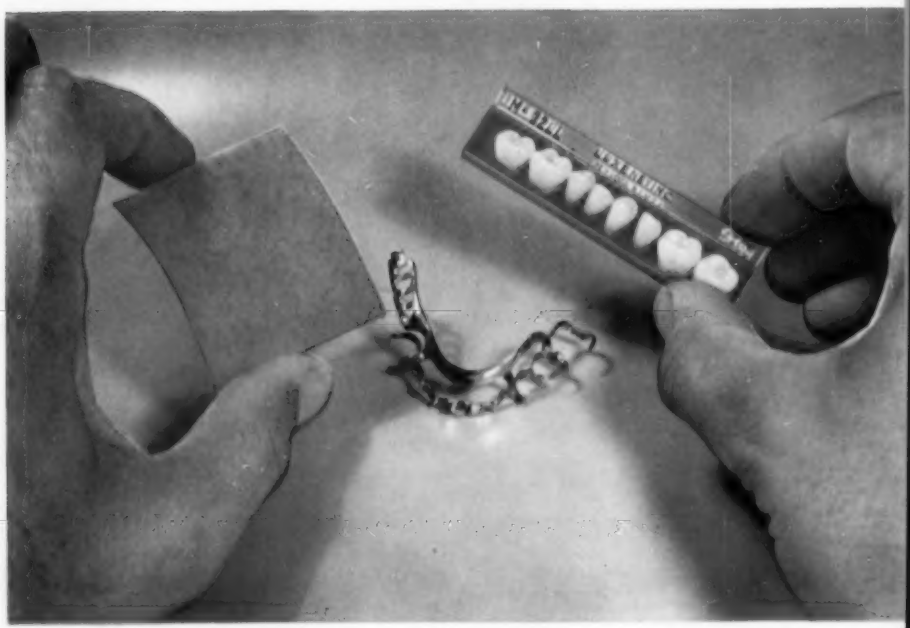

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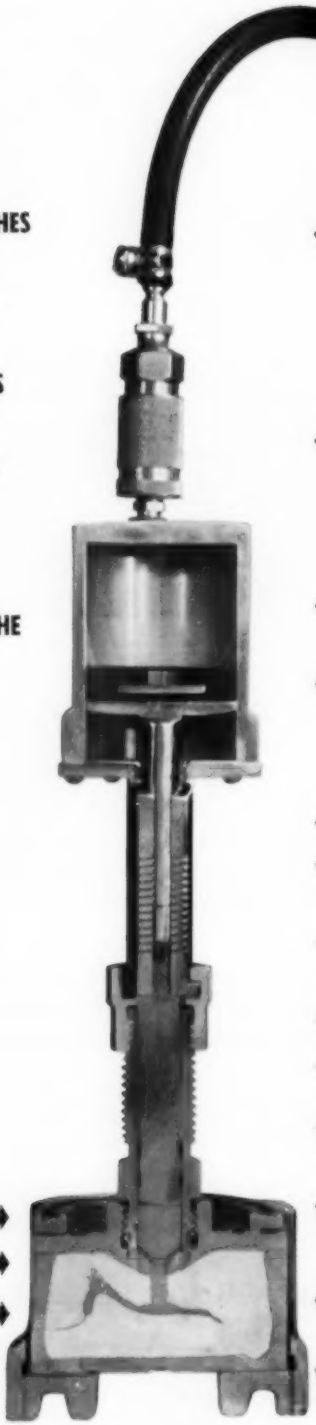

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Nozzle threaded to screw into air adapter.

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Bottom ring of the "cage" which, w tightened in cage closer, closes the f perfectly.

Lid and bottom surface perfectly flat so as to close uniformly.

Side of cage.

Flask splits here. Notice how perfectly closed — metal to metal contact.

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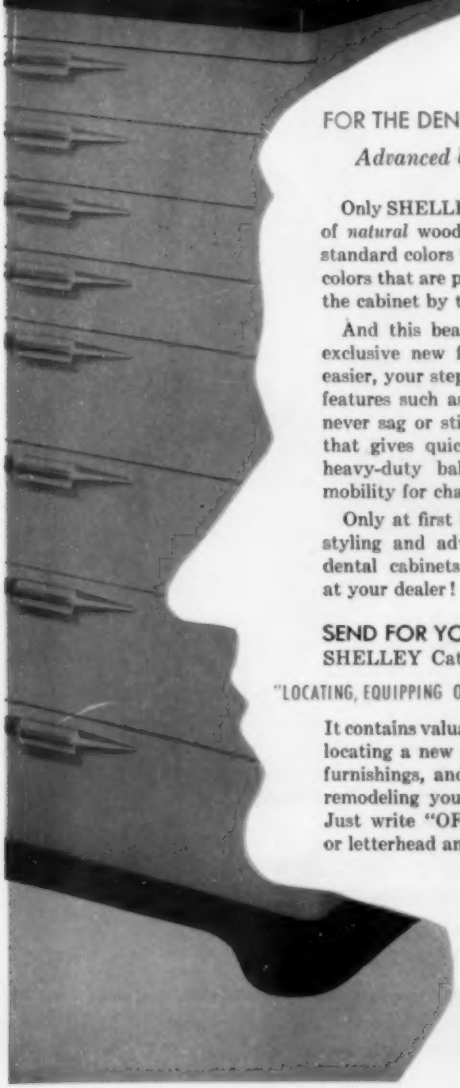

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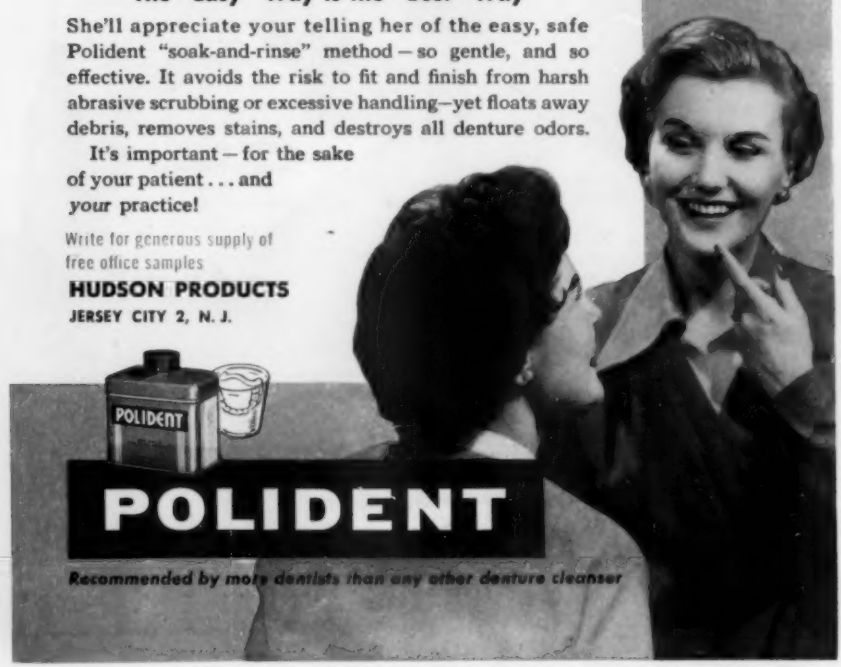

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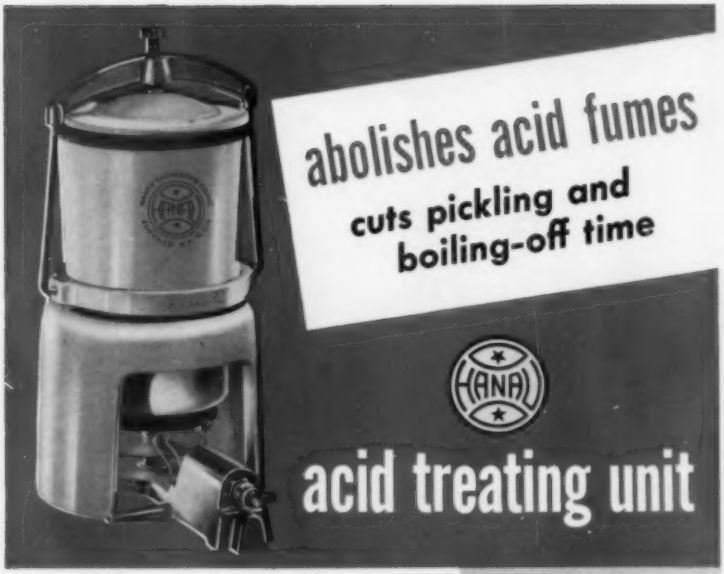

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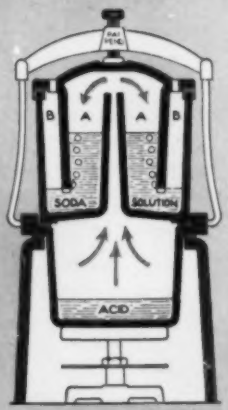

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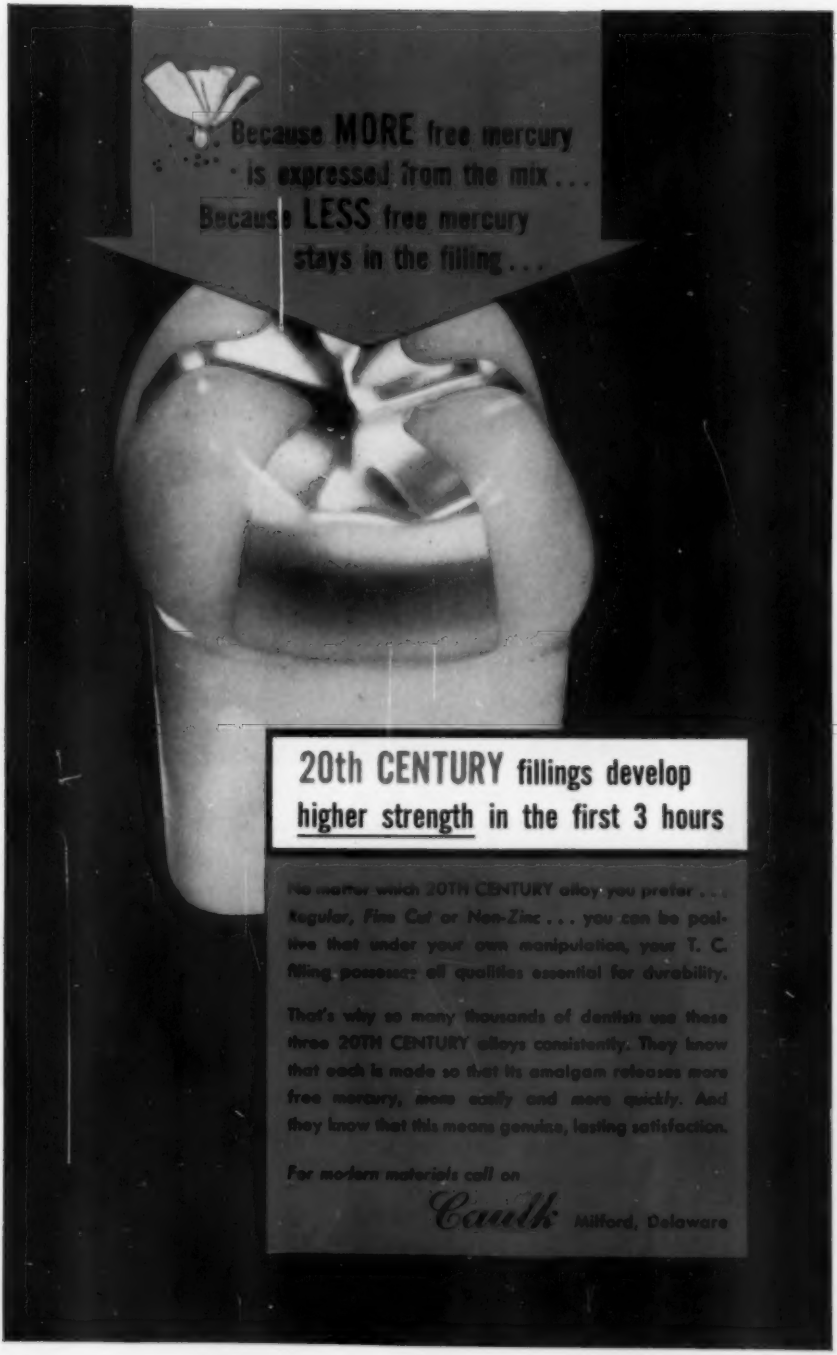
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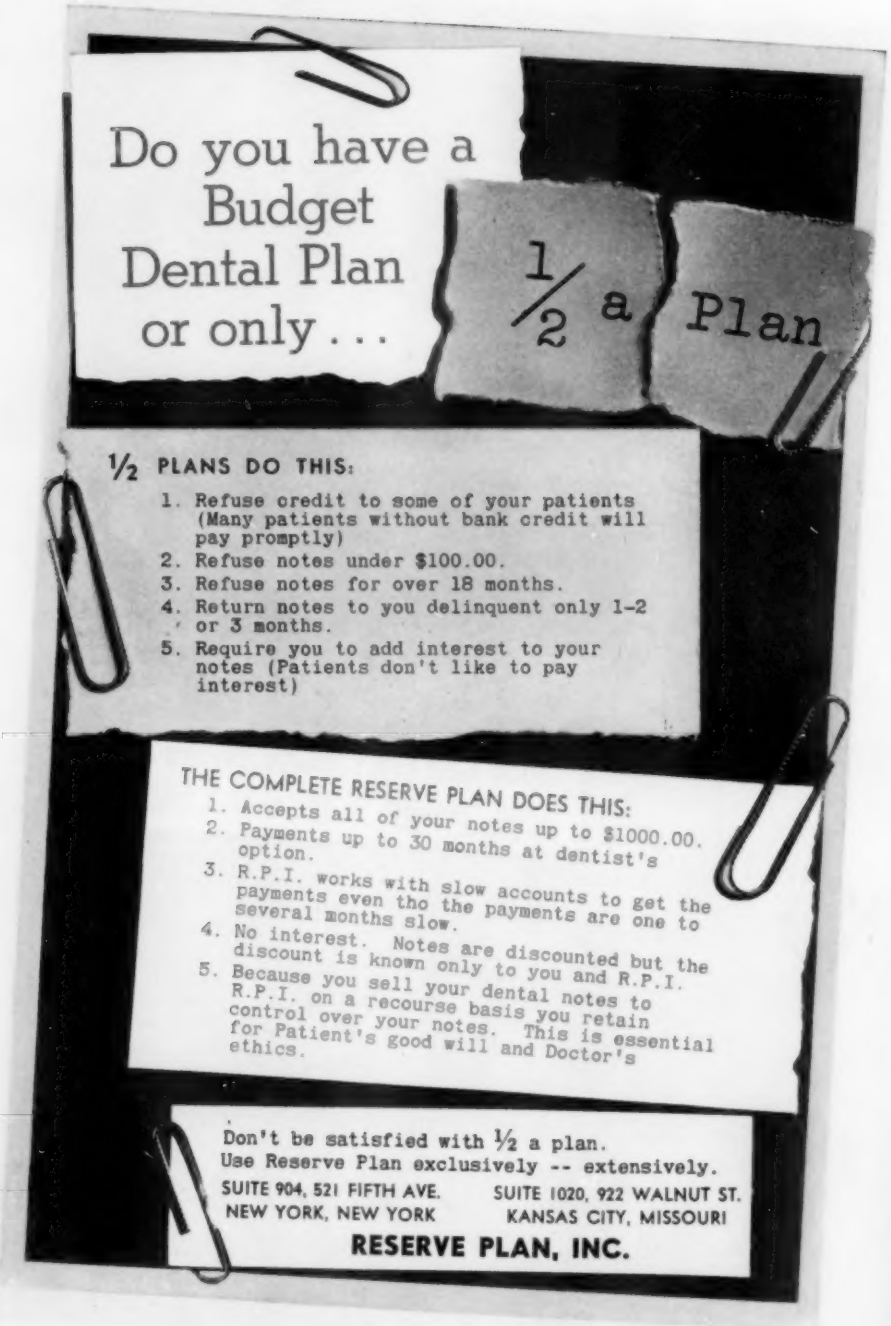
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5. Because you sell your dental notes to R.P.I. on a recourse basis you retain control over your notes. This is essential for Patient's good will and Doctor's ethics.
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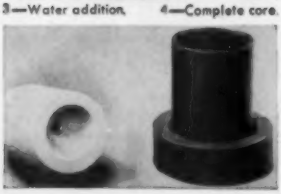
1—Inserting inlay in rubber mold.

2—Pouring investment.

3—Water addition.



4—Complete core.

For the New Controlled Water Addition Process!

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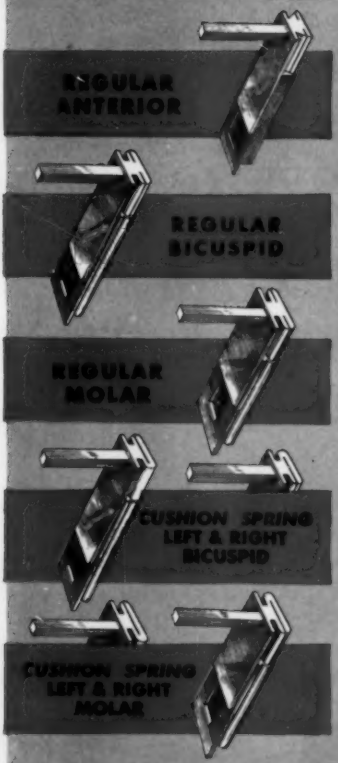
BAKER REGULAR AND CUSHION SPRING

PRECISION ATTACHMENTS



Baker Precision Attachments in 3 sizes for Anterior Bicuspid and Molar are made of Orthoclasp #2 Wire Alloy. Fuses at 2732°F. Brinell of 245.

All Baker Precision Attachments can be used in any location in the mouth. However, the left and right Cushion Spring Type are recommended when using clasp or lingual arm rests because they are so easy to adjust to the exact, delicate amount of permanent spring tension required, with an ordinary penknife blade.

The extraordinary resiliency of the hard, wear-resistant Orthoclasp #2 Wire Alloy eliminates the need of continued adjustments. They do not oxidize and can be soldered or cast against with definite assurance that the very hard, high fusing box will not warp.

All mandrels, posts and boxes are interchangeable. Be sure when ordering to state if mandrels are required.

Baker Split Pin Denture Attachments are supplied in 14 and 16 gauge, mandrels included. Their mouth efficiency and value in eliminating unsightly clasps from inexpensive partial dentures has been proven over many years of successful mouth service.

For cases you will be proud to see in years to come, we recommend Baker Chicago 4 for gold-colored cases and Baker 14% Casting Gold for platinum-colored cases.

If your dealer does not handle Baker Golds, order direct giving us your dealer's name.

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recommend non-cariogenic

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REFRESHING MINT FLAVOR!

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Please give druggist's name and address.

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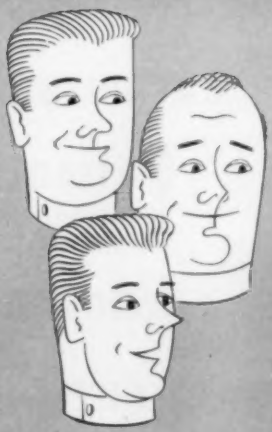

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for caries-active patients *prescribe*

Amurōl

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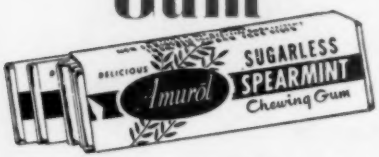

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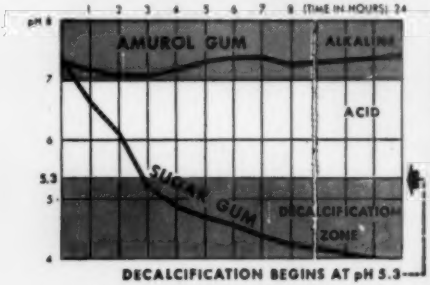
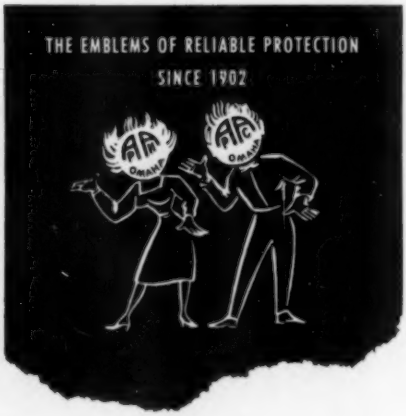
AMUROL PRODUCTS COMPANY
116 S. MICHIGAN AVE., CHICAGO 3, ILL.

Comparative *in vitro* Effects of Sugar Gum and Amurol Gum added to Saliva



As shown above, pH of caries-active saliva *in vitro* remains in alkaline zone for hours with AMUROL SUGARLESS GUM, whereas with sugar gum the pH drops to the acid level under the same conditions.



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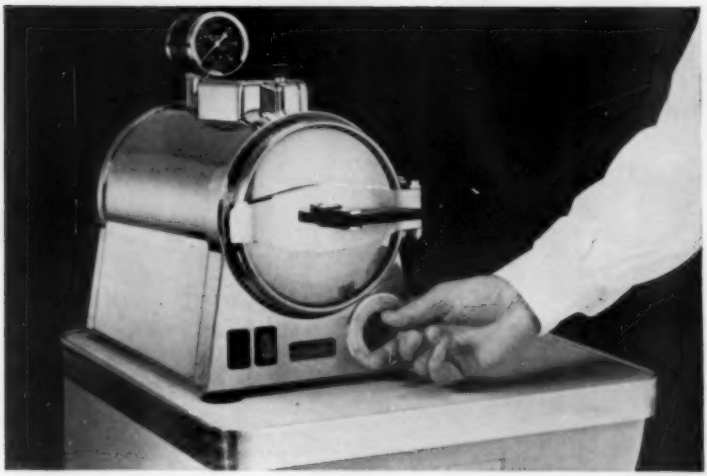

Set *ONE* dial, it's that simple!

All you do is put materials into the SpeedClave . . . the time switch does the rest.

No valves to turn—no watching. In 15 minutes instruments are sterilized *with Hospital Safety.* (5 minutes less if SpeedClave is hot.) What could be simpler or easier?

Then SpeedClave shuts off automatically. Saves electricity, cuts heat in your office. And you have the unquestionable SAFE ANSWER TO THE QUESTION, "IS A BOILED NEEDLE A SAFE NEEDLE?"

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How discouraging it can be: the denture is beautiful in appearance and perfect in fit—yet the patient persistently complains of discomfort and instability! When apprehension and awkwardness thwart adaptation, "psychological failure" can indeed be a problem for the dentist . . . and unnecessarily so!

For most "PF" patients, only a *little* more help may be all that is needed—as provided so readily by Wernet's Powder. Its soft, resilient cushion makes retention and stability seem so much easier, and adequate self-confidence so much more assured. The denture becomes more comfortable, too, through absorption and distribution of unaccustomed pressures on sensitive tissues.

Why risk
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Frustration
from patients'
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Failure?

Speeds the Mastery of the

WERNET'S POWDER

For the patient, such assistance may be actually indispensable—especially in the presence of anatomical or emotional difficulties. For the dentist, it's a gesture of sympathetic consideration . . . and a sound solution of his "PF" problem.

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Please send me professional samples of Wernet's Powder.

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WERNET DENTAL LORE

Anon., 1956

Arsenic has only recently fallen into disrepute as a drug for dental use. The ancient Chinese "cured toothaches" with it; the Arabian physician, Avicenna (980-1037), applied it to "make loose teeth firm"; his countryman, Arculanus (1412-1484), "stopped hemorrhages" with it after tooth extractions; and earlier American dentists used it in pulp extirpation. The introduction of procaine as an anesthetic now permits the nerve to be killed by a less hazardous and less painful procedure.

• • •

Synostosis — or the fusion of the teeth into a single structure — was reportedly observed by ancient writers, as late as Plutarch. Brusia, King of Bithynia, and Pyrrhus, King of Epirus, were supposed to have had this idiosyncrasy. However, since the condition has never been observed since, one may wonder if the reports merely represent a deferential apology for the royal failure to use a toothbrush!

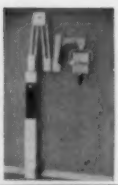
• • •

Women actually practiced dentistry long before they were officially accepted by the profession—Mmes. Dawson, Povey and de St. Raymond, for instance, having advertised their services as far back as 1557, 1719, and 1777 respectively. However, two of these ladies (and probably the third) were widows of dentists, carrying on successfully their late husbands' practice; and their professional activities could hardly be construed as a gesture of female emancipation.

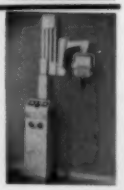
• • •

In Madras, the third largest and one of the most charming of the cities of India, the amenities of modern life have been successfully integrated into the original old-world pattern. This adaptation of old facilities to new requirements, which is becoming so typical of India, is well demonstrated too in Gum karaya, a long-familiar native product, which has been transformed by modern laboratory know-how into the basic ingredient of Wernet's Powder.

Even the x-ray unit tells her she's in the best of hands



GE-70
Fixed x-ray output — 10 ma at 70 kvp.



GE-90
For any kilovoltage 40 to 90 kvp.

THAT look of quality and efficiency in the equipment you use is one of the things that contributes to a patient's satisfied confidence in you. *That look* is a built-in feature of every G-E dental x-ray unit — built in right along with truly functional power, speed and safety.

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Typical of dental neglect and its aftermath, these illustrations of a prognathous case dramatically show the benefits of an engineered open bite removable.

The bite opening of about 2 M.M. was just sufficient to remove the anterior traumatism, restored occlusion and prevented further occlusal injury. The finished restoration is a remedial application made to precise dimensions.

DIAGNOSIS—The need and opportunity for open-bite service is often observed only after mounted casts are prepared for study. These show the effects of bite closing and the need and rewards that follow bite opening.

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   (In cases of pulpal exposure)

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DI-CET is supplied in foil packets for easy, safe storage. Each packet makes a full quart of DI-CET Disinfecting Solution. Anti-rust and water softener materials are also incorporated in the powder.

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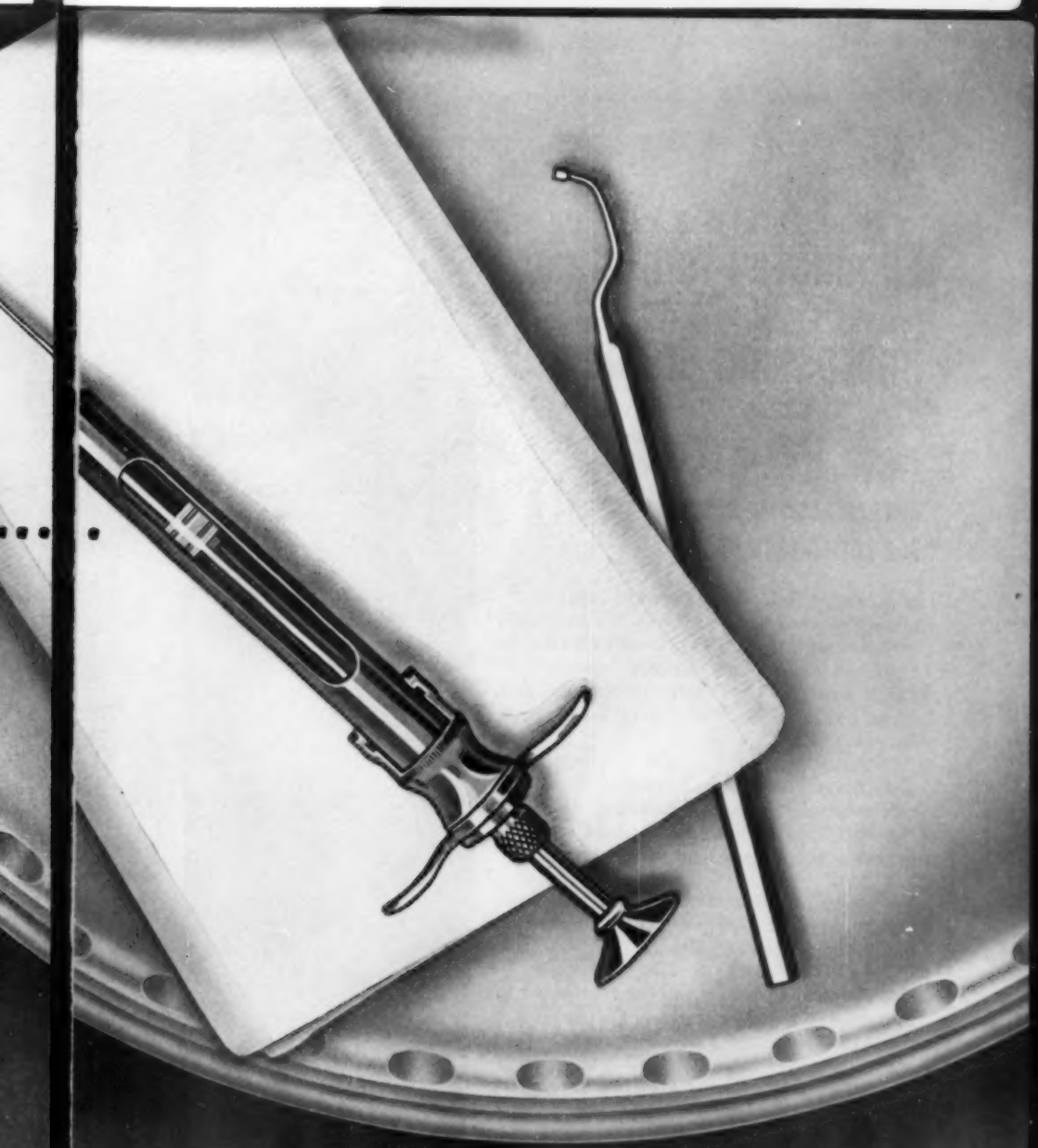

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So efficacious is Nevocaine HCl 0.4% and Novocain 2% with Levophed 1:30,000 or Cobefrin 1:10,000 that less than the average volume usually is entirely adequate for routine cases.

Eliminates four major impression problems!

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RUBBER BASE IMPRESSION MATERIAL FOR EDENTULOUS CASES

New, elastic R-28 impressions can easily be removed from any undercut, no matter how deep, with no cracking, chipping, breaking or distortion. And you can have complete confidence in the accuracy of your R-28 impressions—*they literally snap back to their original detail-perfect shape.*

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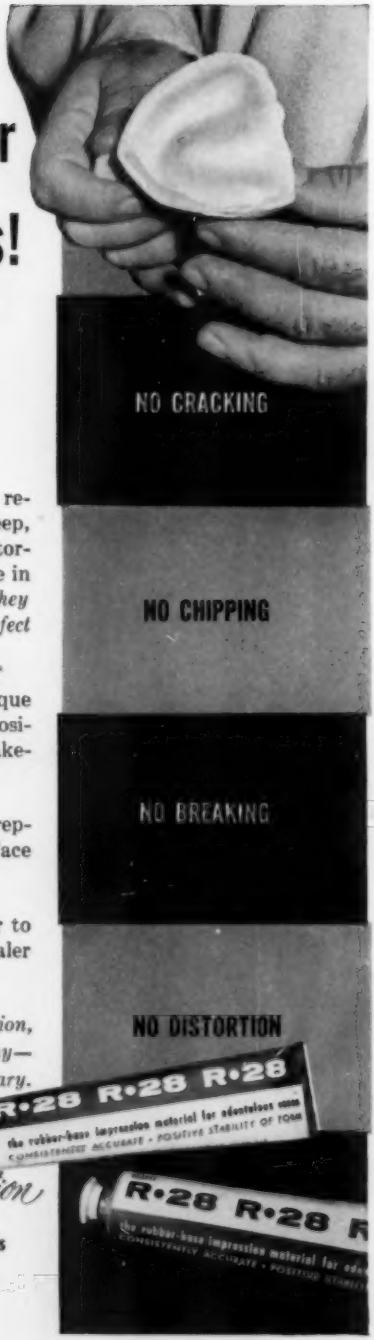
Also excellent as a corrective impression, using the old denture as a tray— no adhesive necessary.



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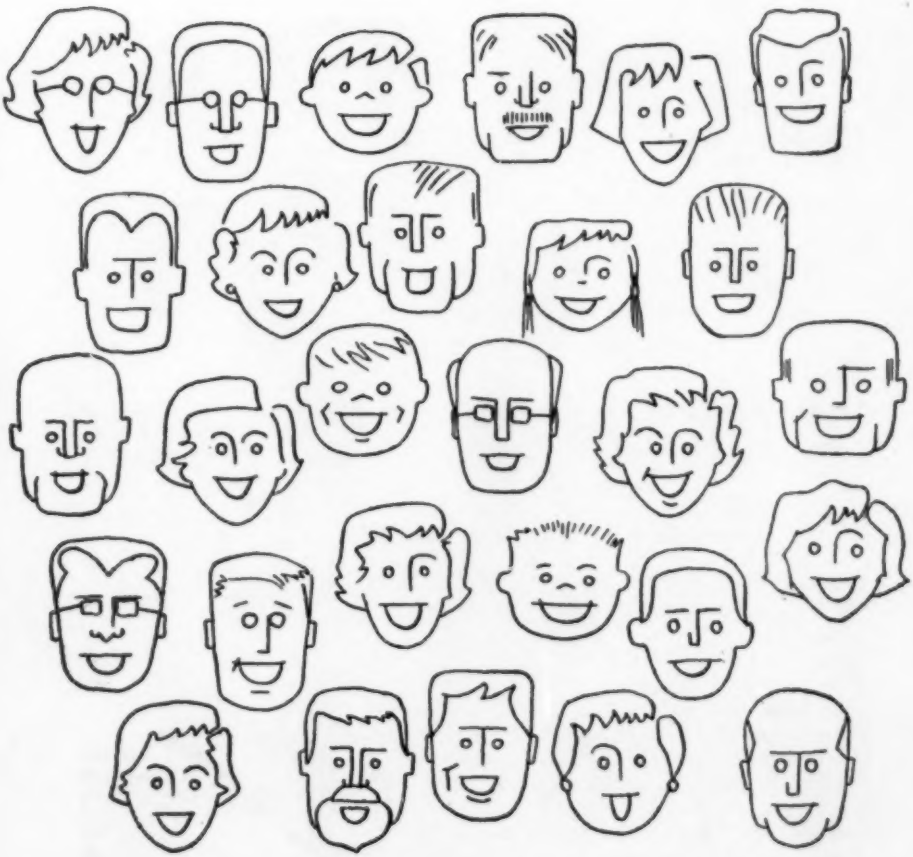
The William Getz Corporation

7512 South Greenwood, Chicago 19, Illinois



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Patients return happily for additional appointments when they know you have their comfort uppermost in mind.

Give BUFFERIN, the sodium-free antacid analgesic; effective after extractions and other painful dental procedures. Tell your patients to take it at home, too. Rapid relief of pain follows its use. Gastric upsets, so common with straight aspirin, are minimal.

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blend, 1. blend; 2. blĕnd, v. It.
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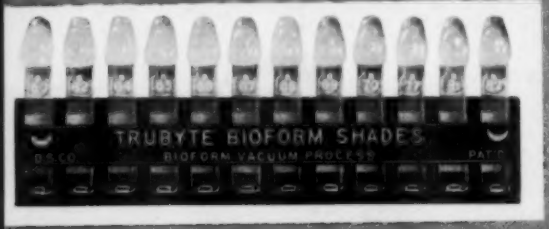
B also stands for BIOFORM®

. . . and it's the *natural blending* of shades in Trubyte Bioform which accounts for their natural, vital and radiant appearance in the mouth. Trubyte Bioform Teeth are blended *just like natural teeth* . . . shaded in the set *just like natural teeth* . . . and accurately reproduce the colors *found in natural teeth.* Only Trubyte Bioform vacuum fired porcelain offers such superbly natural tooth shades.

Start specifying "B For Bioform" today, and you'll note immediately the improved esthetic appearance of your complete and partial denture cases.



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TRUBYTE BIOFORM THE FIRST VACUUM FIRED PORCELAIN TEETH

ASK YOUR TRUBYTE DEALER *to show you the "10 Features of Trubyte Bioform Color Superiority"*

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